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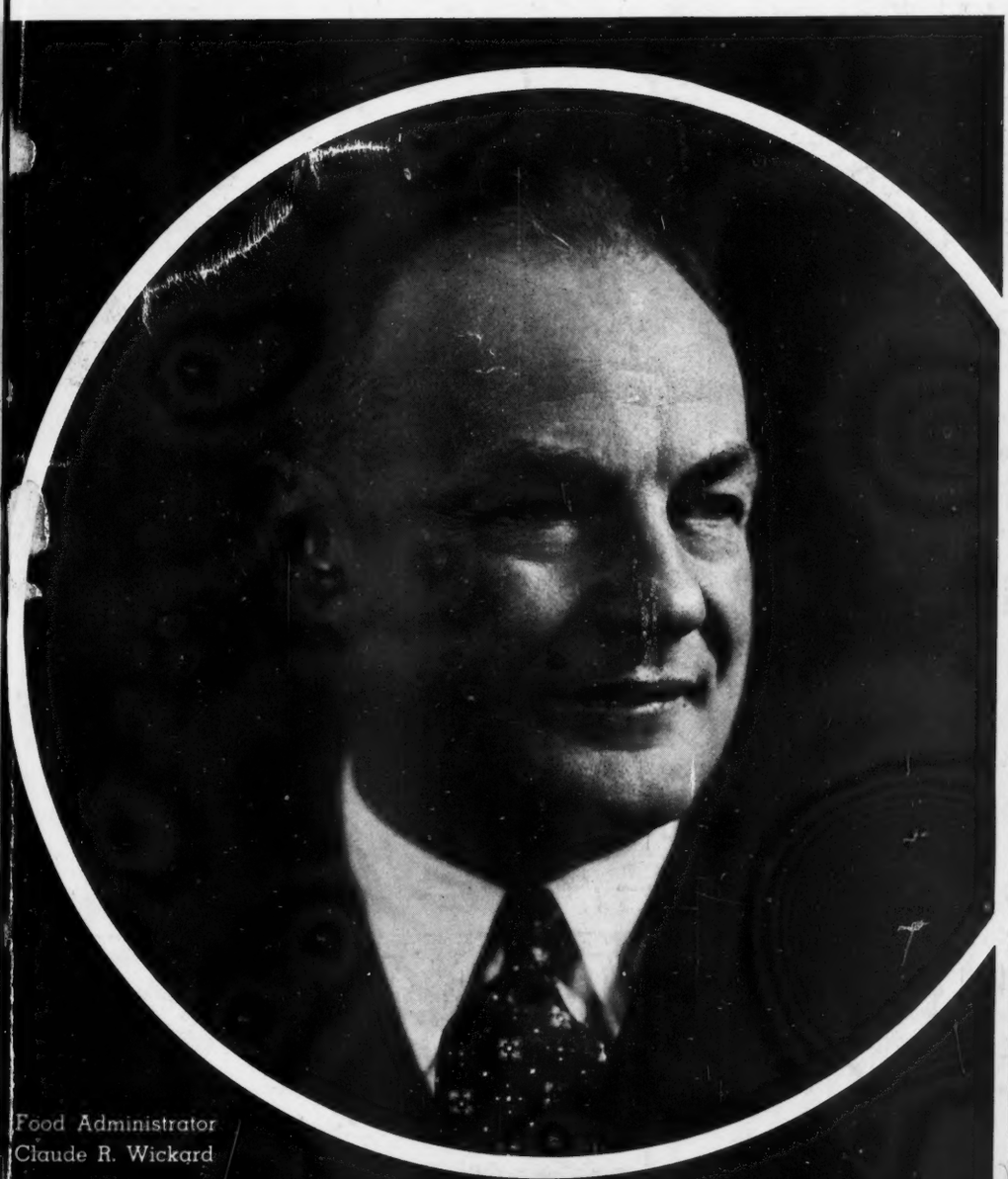

Food Administrator
Claude R. Wickard

JANUARY 1943

Statement by the Food Administrator

Food Can't Be Taken for Granted

Packaging Dehydrated Food

Lye Peeling Saves Waste and Labor

Technology of Pickle Production

Research Promises Aid on Starch Problems

A McGRAW-HILL PUBLICATION

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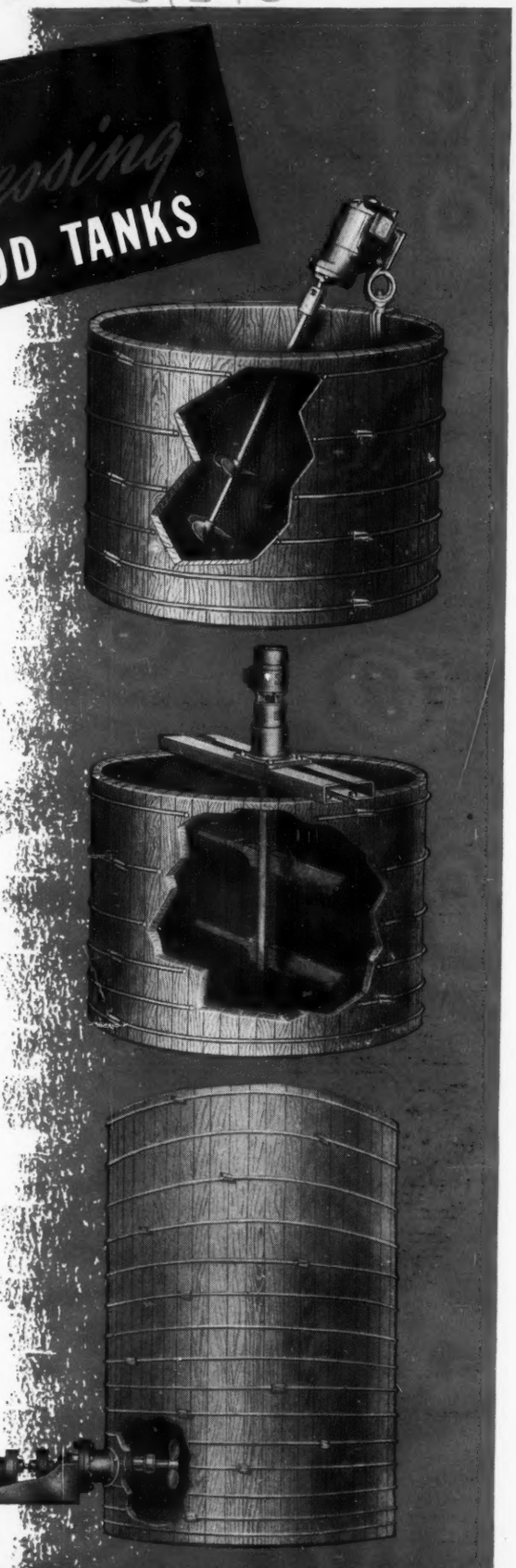
for thorough processing

Use PORTER AGITATED WOOD TANKS



PORTER WOOD TANK WITH "WHIRLPOOL" TYPE AGITATOR

In many plants Porter Agitated Wood Tanks are replacing metal tanks for processing all types of liquids and pastes. Shown at the right is the Porter Agitated Wood Tank with a "Whirlpool" Portable Agitator. Tanks up to 3000 gallon capacity can be efficiently agitated by means of this propeller agitator. Mounted on the top edge of the wood tank, the portable agitator can be moved easily from one tank to another, thus providing low cost agitation.

PORTER WOOD TANK WITH PORTEREDUCER AGITATOR — WOOD SHAFT AND STIRRERS

Porter Cylindrical Wood Tanks can be supplied with Portereducer Agitators operating at speeds as low as 1 R.P.M., and equipped with wood paddle or turbine stirrers. The Portereducer Agitator provides for smoother operation, longer gear life and greater reduction in a given space.

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Porter Wood Tanks as large as 100,000 gallon capacity can be equipped with Porter Side Entering Agitators where no headroom or clearance is available or where a top mounting agitator is impractical. The Porter Side Entering Agitator is especially efficient for agitating large wood tanks inasmuch as it can be easily installed in the field. Construction is simplified to eliminate wearing parts and at the same time produce a substantial unit that will seal contents in the vessel and provide uniform agitation.

Write for Bulletin WT-1 which gives complete details.

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Technology Tech

JANUARY FOOD TECHNOLOGY

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THE COVER

Claude R. Wickard, 49-year-old Indiana born Secretary of Agriculture who was named Food Administrator last month. Mr. Wickard has had a quarter of a century of experience in farm operation and ten years' experience in directing the Nation's farm and food programs. And as chairman of the Food Requirements Committee, he gained first-hand knowledge of the important relationship between production, processing and distribution. He was one of the first to recognize the great part food was to play in this war, as expressed by the slogan "Food will win the war and write the peace." As Food Administrator he has the support of food processors.

FOOD INDUSTRIES

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This Issue

Much Needed Information

As those in the vegetable dehydration industry know only too well, there is a crying need for definite information about the protective performance of different types of packages and packaging materials for dehydrated vegetables. And FOOD INDUSTRIES is pleased to present on page 49 an article which contains this type of information. These facts were determined by tests at the Western Regional Research Laboratory, and the authors of the article are three technologists at the laboratory—A. L. Pitman, William Rabak and Henry Yee.

It Will Save Valuable Food

Now as never before, waste of edible material must be reduced to a minimum in food processing operations. Which lends particular importance to a new lye-peeling method developed by L. Charles Mazzola and described on page 53. Significant savings in the amount of potato thrown away with the peelings are effected. Lye-peeling methods have been used before, but this one utilizes a new principle—strong solution and short exposure to it. The method has potential application to other root products.

New Tool for Technologists

Every so often there comes out of the research laboratory a development which gives the food technologist something new to work with. Such a development has been made and applications for it worked out. It is a modified form of pectin. How the pectin molecule was manipulated to give it new characteristics was told in December, and in this issue is explained what can be done with the new material (page 58). The authors are C. W. Kaufman, E. R. Fehlberg and A. G. Olsen, of General Foods.

Must Be Planned That Way

Someone has remarked that what we take for granted we are likely to lose. That observation was made in regard to liberty, but it applies to more material things, such as food. People have come to look upon food as something that is always to be had in unlimited quantity at the corner grocery. But food won't be plentifully available throughout this emergency unless it is planned that way and unless all concerned cooperate to make the plans good. This situation is made clear in an article by Morris Sayre, executive vice-president of Corn Products Refining Co., on page 47.

Coming

It Involves Thermohygrics

If millers are consistently to produce flour that meets the specifications of bakers and gives uniform results in the homemaker's kitchen, they must store their product in bulk. This permits laboratory analysis and blending to obtain a product of the desired characteristics. But a lot of problems are involved in flour storage, among them thermohygrics, the science dealing with changes of heat and moisture in air. This affects condensation of moisture on the sides of the storage bins, an undesirable development. And there are other problems, all of which will be discussed in a two-part article to be published soon. The author is Edgar S. Miller, who has had much experience in the flour business.

Made Bricks Without Straw

There have been many examples in this war of getting the job done without the normal facilities for doing it, but few surpass the accomplishments of ice cream manufacturers in England. Before they were stopped altogether from making ice cream, they overcame one problem after another as materials became short or were denied altogether. How they improvised will be told by H. B. Cronshaw, English food technologist, in an early issue. And there will be plenty of technology in the telling.

Pickle Technology

Pickle manufacture is an old business, but much is still being learned about it. And some new information, based upon extensive research, is contained in two articles being published by FOOD INDUSTRIES. The first, discussing physical and chemical changes in cucumber fermentation, appears in this issue (page 62), and the second, covering bacteriological changes will appear in February. The authors are Ivan D. Jones, North Carolina Agricultural Experiment Station, and John L. Etchells, Bureau of Agricultural Chemistry and Engineering.

Picture Flow Sheet

There are two ways of illustrating a process. One is by pictures showing the equipment and operations. The other is by schematically diagramming the equipment and the direction of flow through the various steps. And these two methods will be combined to present as effectively as possible the operations and equipment involved in a typical vegetable dehydration plant. This picture flow sheet will appear in an early issue.

★ ★ ★ CHANGE OF ADDRESS ★ ★ ★

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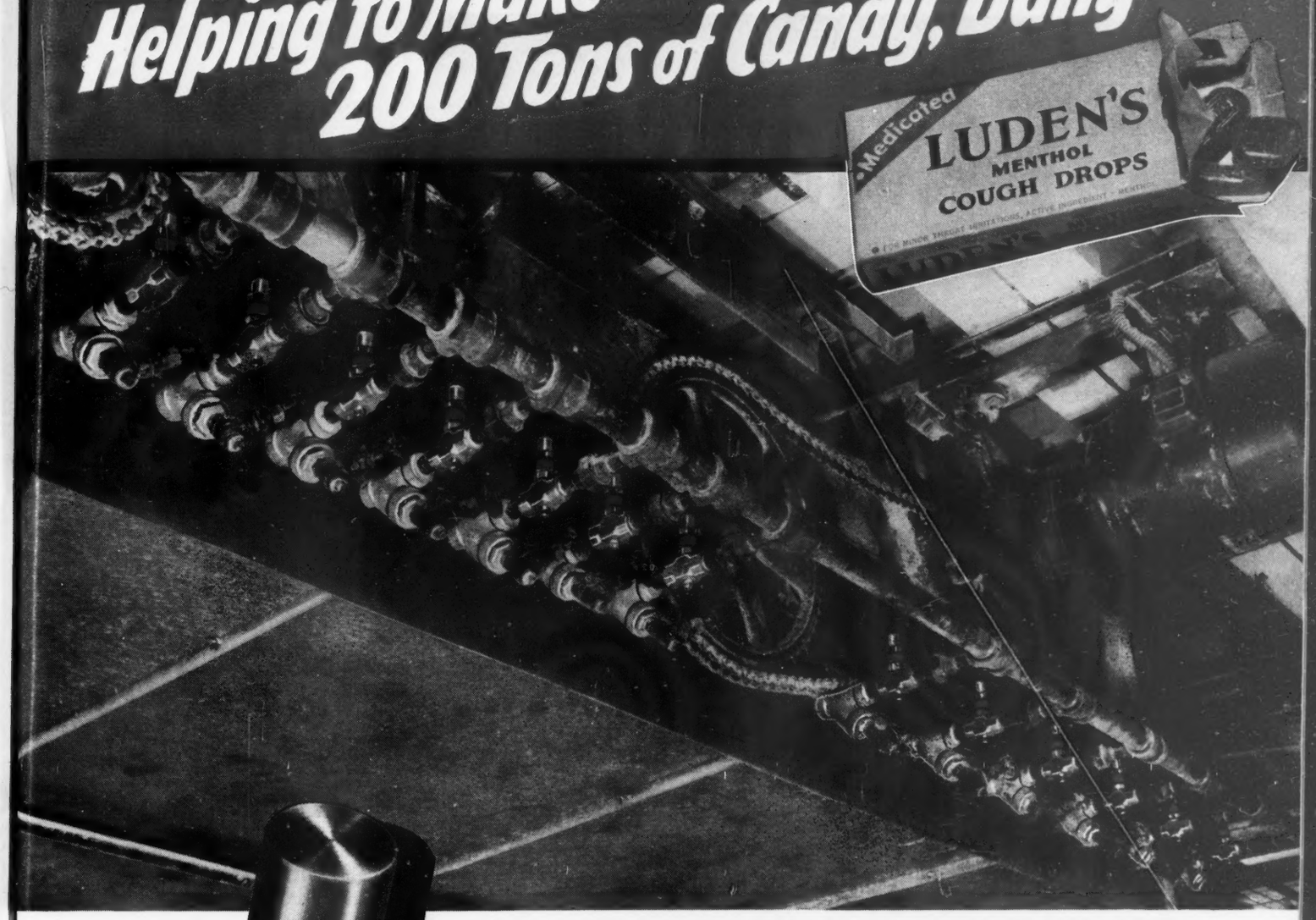
Helping to Make 200 Tons of Candy, Daily



AT the great plant of Luden's, Inc., Reading, Pa., many YARWAY IMPULSE STEAM TRAPS are on the job getting equipment hotter, sooner, and keeping it hot to speed the tremendous production of cough drops and candy.

The picture shows thirteen of these Traps, individually draining each of the heating coils of a starch conditioner. The chief engineer reports: "After three years of service, without attention, these Traps are still keeping this *dryer* at peak efficiency". Other YARWAY IMPULSE TRAPS are in use on cooking kettles, vacuum cookers and other process equipment at this plant.

More than 180,000 Yarways have been sold

Yarway Trap performance talks. *Quicker heating and greater sustained heating efficiency* soon pay for the installation and continue to return worthwhile profits in plant operating economy. When you consider that their *purchase price* is usually *no more than the cost of repairing an ordinary trap*—why not get Yarway performance for your money?

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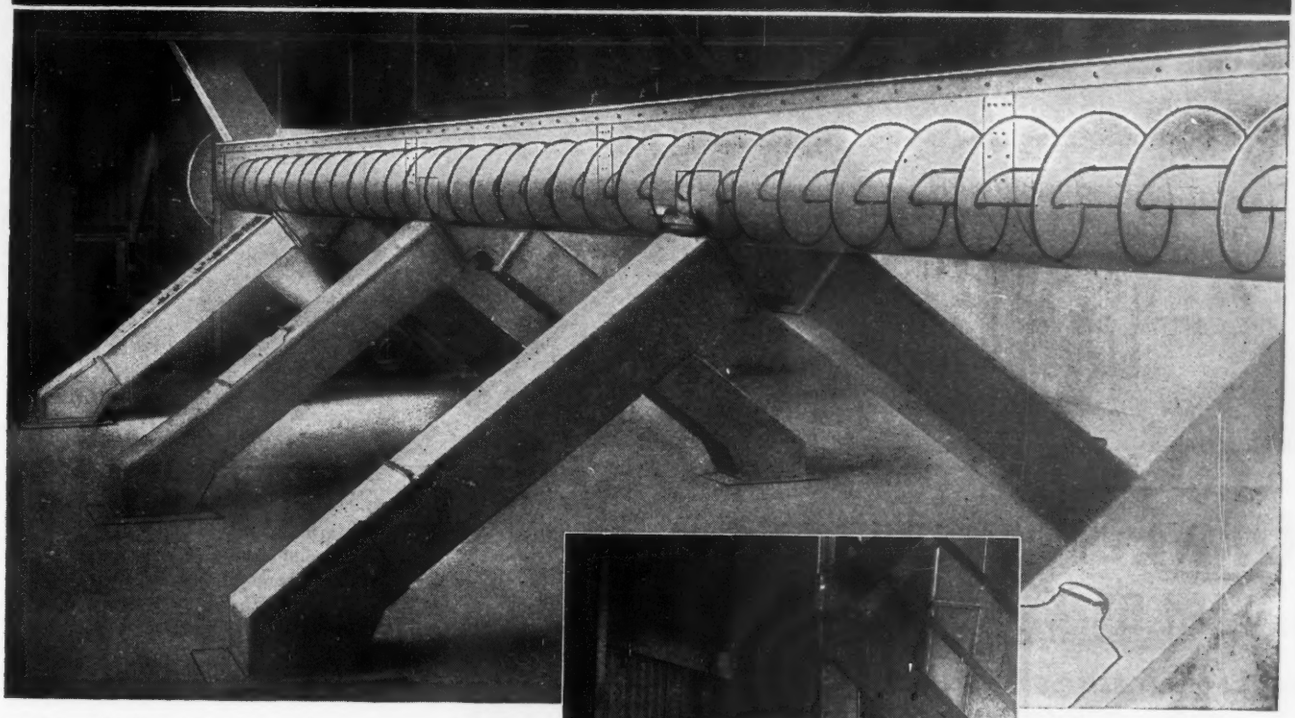
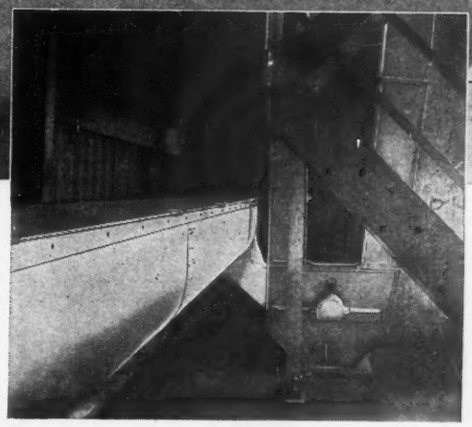
Here's How LINK-BELT Conveyors Help Produce CORN FLAKES





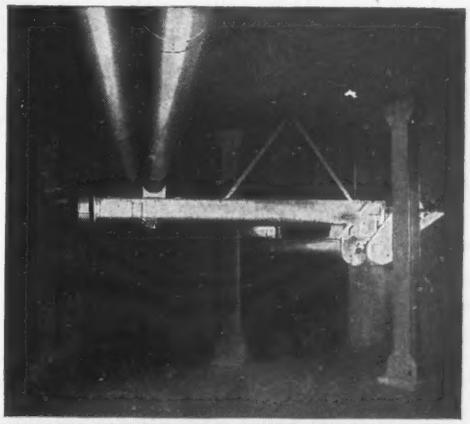
● Handling whole corn kernels to silo storage and from storage to the many places throughout the plant, is being efficiently done with Link-Belt screw conveyors at Kellogg Company of Canada, Ltd., London, Ontario. Other Link-Belt equipment entering into the cycle of operations is a car spotter, a power shovel and three bucket elevators. Link-Belt roller chain drives are used on all screw conveyors.

Upper: Distributing screw conveyor over storage bins.

Left: Screw conveyor delivering to bucket elevator which in turn discharges into screw conveyor shown above.

Lower: Screw conveyors drawing off corn kernels from bottom of storage bins and distributing to plant.

Link-Belt screw conveyor enclosed in dust-tight trough prevents contamination of stock being handled, eliminates the dust hazard, saves space and reduces power and maintenance costs. Link-Belt experienced engineering . . manufacturing ability . . and facilities . . combine to give you a cooperative service that is outstanding in screw conveyor production. We make all types—for horizontal, vertical or inclined plane. Book No. 1289.



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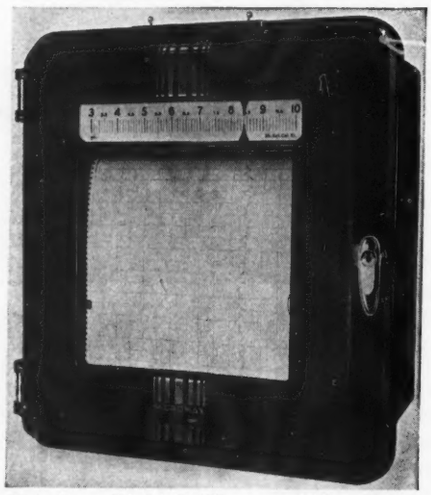
The job of checking pH has been greatly simplified, in several departments of a certain process-industry plant, by the Micromax pH Recorder shown above.

This Recorder was installed primarily for the one department of water purification. They wanted it to check the acidification which follows zeolite softening of the entire plant's supply. But, after the instrument began to operate, chemists found they had steadier pH in other departments. A quick look turned up the reason; it was simply that the zeolite operator had formerly checked pH only when he thought it necessary, and, being human, he had sometimes slipped; whereas with the Micromax automatic record always before him he has all the checks he needs to hold pH consistently at that plant's optimum of 7.

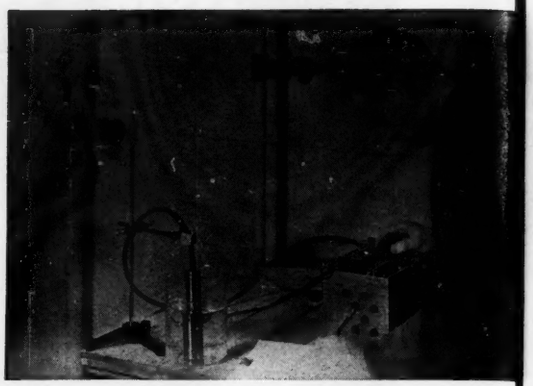
Automatic Control If Desired

Automatic control of the addition of acid reagent after zeolite softening is always practical, and control of either acid or alkali in other water-conditioning processes is practical in the great majority of cases. The Glass-electrode Micromax Recording Controller can be either the Round-chart instrument shown, or a Strip-Chart Model. If you have a pH recording problem, outline it to us.



Strip-Chart (Model S) Micromax pH Recorder as used in a paper mill.

depends on me!



Quick, Accurate Checks of Liquid's Conductivity

The lab helper shown above is checking the conductivity of water. He carries the L&N Conductivity Indicator to the bench, plugs it into the lighting circuit, draws a beaker of water and drops the conductivity cell into it. In less than a minute, he's made the measurement and is on his way.

If you could use an instrument like this, ask for Catalog EN-95, which describes it.

Admiral Henry A. Wiley, with Factory Manager W. R. Coley of L&N, pauses for a word with a girl employee at time of Army-Navy "E" Award. President C. S. Redding of L&N, joined by spokesmen for employee groups, pledged continued increases in production. William L. Batt, Vice-Chairman of W.P.B., voiced the Board's pleasure at having the achievements of Industry so recognized by our armed forces.

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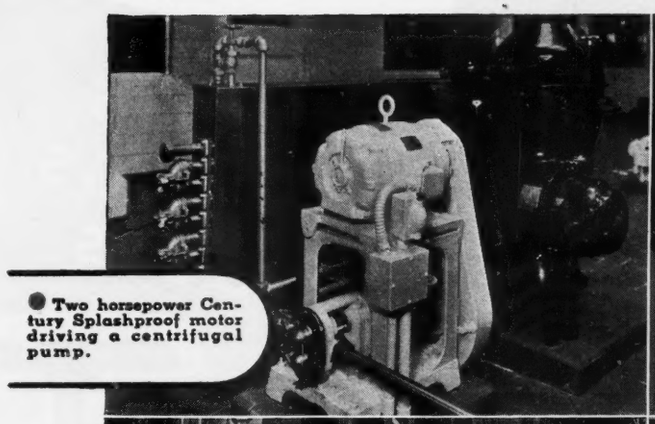
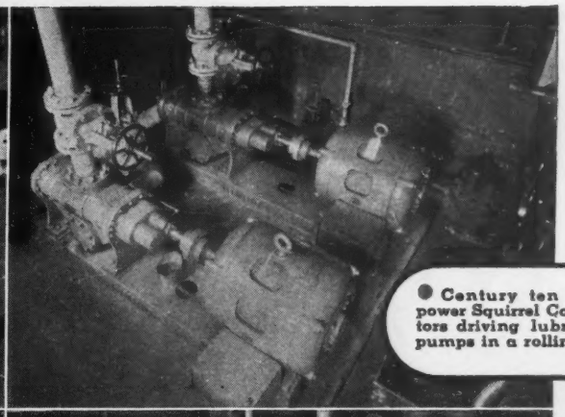
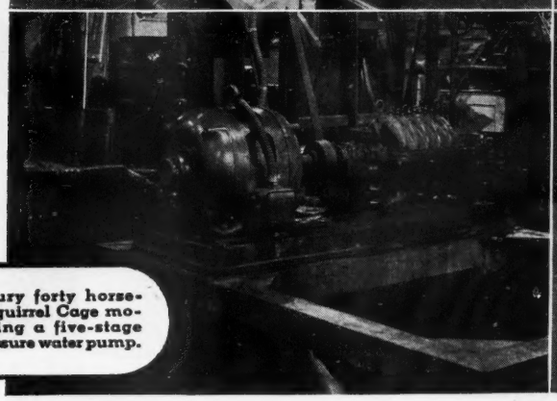


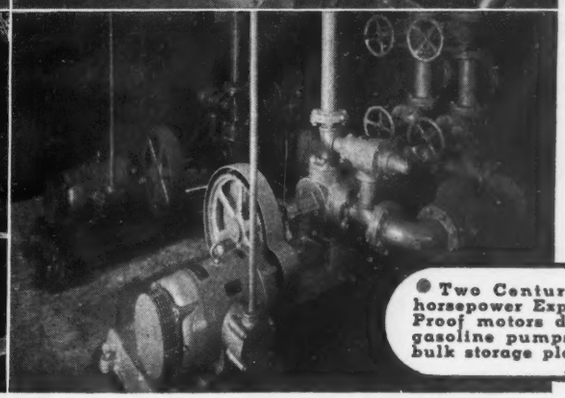
● Two horsepower Century Splashproof motor driving a centrifugal pump.



● Century ten horsepower Squirrel Cage motors driving lubricating pumps in a rolling mill.



● Century forty horsepower Squirrel Cage motor driving a five-stage high pressure water pump.



● Two Century five horsepower Explosion Proof motors driving gasoline pumps in a bulk storage plant.

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There's the *right* Century Motor for these and many other pumping requirements:

Water	Gasoline
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Dusts
Coolant Spray
Heat and Cold
Moisture
Explosive Grain Dusts (Class II, Group G)
Explosive Gases (Class I, Group D)

304

Century Motors are built to meet practically every type of pumping application efficiently and effectively — on land or sea.

Depending upon the surrounding operating conditions, pump installations may require *Century Open, Drip Proof, Splash Proof, Totally Enclosed Fan Cooled, or Explosion Proof Motors.*

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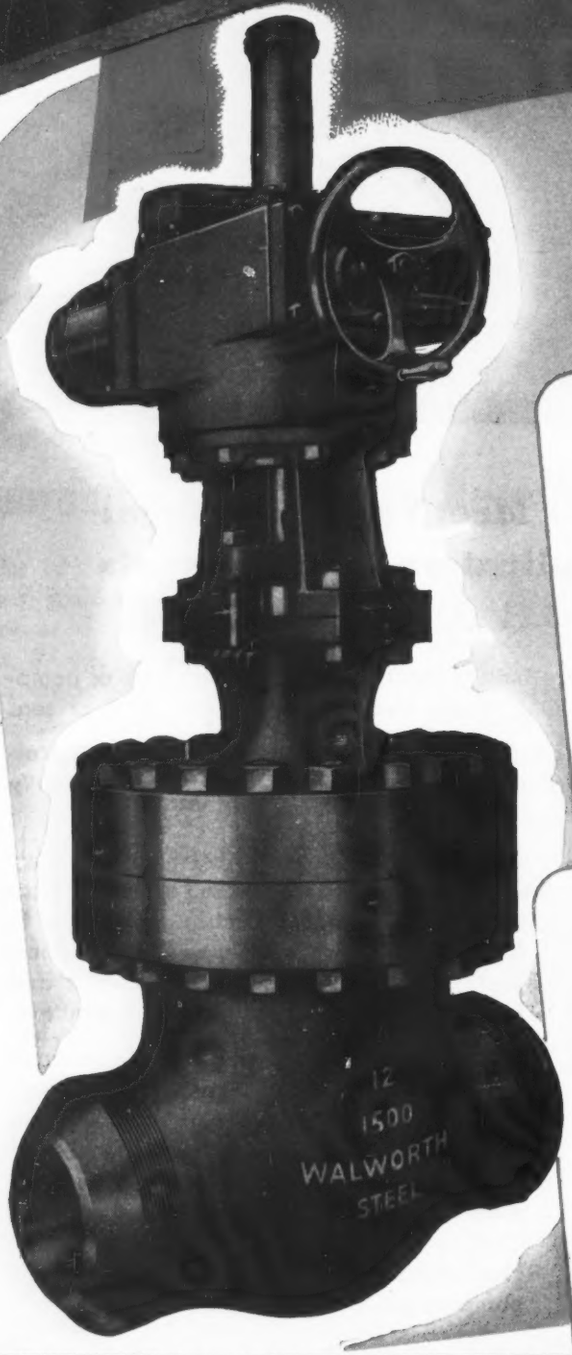

BRONZE VALVES

Gate, Globe, Angle and Check—These Walworth types are made for all pressures, temperatures, and services for which bronze valves are suitable. Walworth No. 225P Globe Valve, illustrated, has a stainless steel, plug type, seat and disc, heat treated to a minimum of 500 Brinell hardness. Boiler scale, sand, grit, and other foreign particles cannot mar the surface of either the seat or disc. Wire-drawing is practically eliminated. Extra large stems and long stem threads have been provided to decrease thread wear and increase valve life. Every part has been designed to assure maximum protection against wear and leakage. For complete information regarding Bronze Valves refer to Walworth Catalog 42, Sections 2-6.

CAST STEEL VALVES

Illustrated at the left is a 12", 1500 lb. Walworth Steel Valve with welding ends. Walworth Steel Valves in all series can be furnished with welding ends, screwed ends, or flanged ends within the limits of war production. The complete line of Cast Steel Valves, in Gate and Globe types, have extra strength and protection due to heavy walls. Deep stuffing boxes eliminate costly leaks. Flow loss at high velocity is decreased by streamlined ports. Every detail of design, metallurgy, and construction helps to assure better and longer service. See Sections 16-17 of Walworth Catalog 42 for complete data on Cast Steel Valves.

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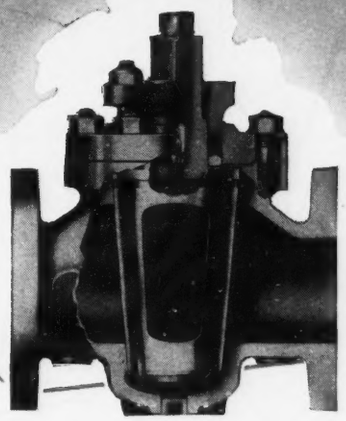
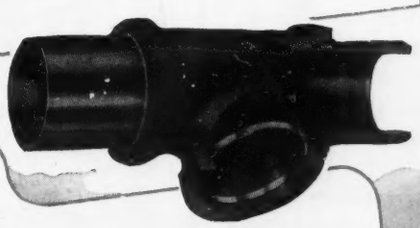


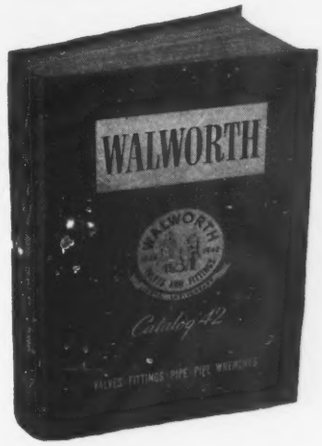
LUBRICATED PLUG VALVES

Some fluids are difficult to control with conventional types of valves — but Walworth Lubricated Plug Valves do the job safely and easily. They may be opened or closed with but a quarter turn of the handle, and have proved their ability to give a dead-tight shut-off. Operation is sure and smooth. All these qualities plus greater protection against corrosion and erosion make Walworth Lubricated Plug Valves ideal for "difficult" jobs. They are made in sizes from ½ to 24-inches and for pressures from 125 to 5000 lbs. Complete information on Lubricated Plug Valves will be found in Section 15 of the new Walworth Catalog.



WALSEAL FITTINGS

For Leakproof "One-piece" Copper or Brass Pipe Lines — Walseal Fittings are threadless bronze fittings into the ports of which the exact amount of silver brazing alloy has been inserted by Walworth at the time of manufacture. Joints are made by inserting the pipe end into the fitting port, then heating both pipe and fittings with an oxyacetylene flame. The result is a *Silbraz Joint* which saves time and effort, and which is silver-brazed — not soft soldered. A brass or copper line made up with Walseal Valves and Fittings is actually a "one-piece" line, leakproof, vibration-proof, shock-proof, and corrosion-resistant. Refer to Section 20 of Walworth Catalog 42 for complete information on Walseal Fittings.



SPECIFY FROM THE NEW WALWORTH CATALOG 42

The new Walworth Catalog 42 is just off the press. It gives the latest information on any question concerning Walworth products. It is clearly indexed and contains complete up-to-date data on valves, fittings, and pipe, including working and test pressures, plus service recommendations. Conformity of metals to A.S.T.M., Marine, and U. S. Navy specifications is given in detail. Dimensions for layout and operation, as well as engineering data, make valve and pipe installations easier and add to the usefulness of this new Walworth Catalog 42. Be sure to get a copy. Fill out and attach the handy coupon to your letterhead.

Address your inquiry to Dept. **Fl,**
Walworth Co., 60 East 42nd St., N. Y. C.

Please send a copy of the new Walworth Catalog 42 to:

*Name*_____

*Title*_____

*Company*_____

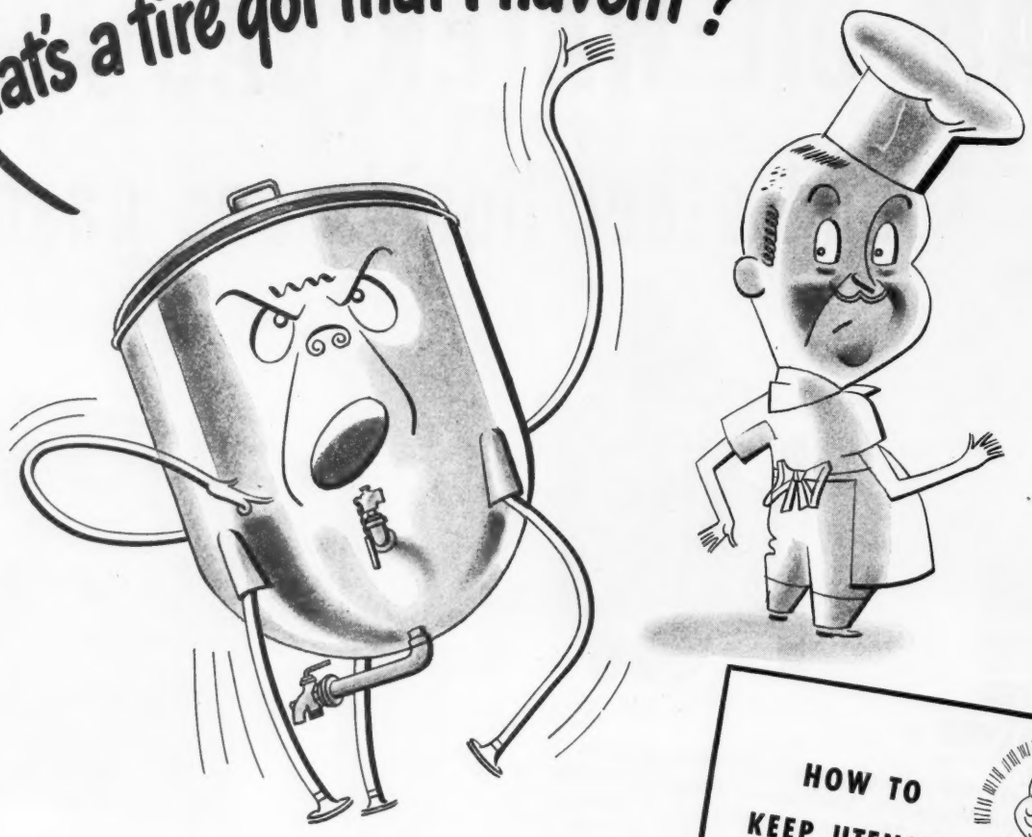
*Address*_____

*City*_____ *State*_____

WALWORTH 1842 1942 VALVES AND FITTINGS 100TH ANNIVERSARY

One hundred years ago Walworth first manufactured valves and fittings. Walworth has been manufacturing these products continuously ever since.

What's a tire got that I haven't?



That's a fair question! You hear a lot about saving tires but little about making Aluminum Utensils last as long as possible. Doing both is important.

It's not just that Aluminum Utensils are scarce, aren't being made again till after the war. It is actually a double saving to take good care of your Aluminum.

First, you save having to buy new utensils. Second, you save food. By having good Aluminum that spreads heat evenly without hot spots, you cut down waste from scorching and burning.

In fact there's a third good reason for making your utensils see you through. When the war is over and the Wear-Ever plant switches back to pots and pans, they are going to be 'way ahead of any you've ever seen. You are going to want these new, improved utensils because they will cut the cost and raise the quality of your cooking.

HOW TO KEEP UTENSILS HAPPY

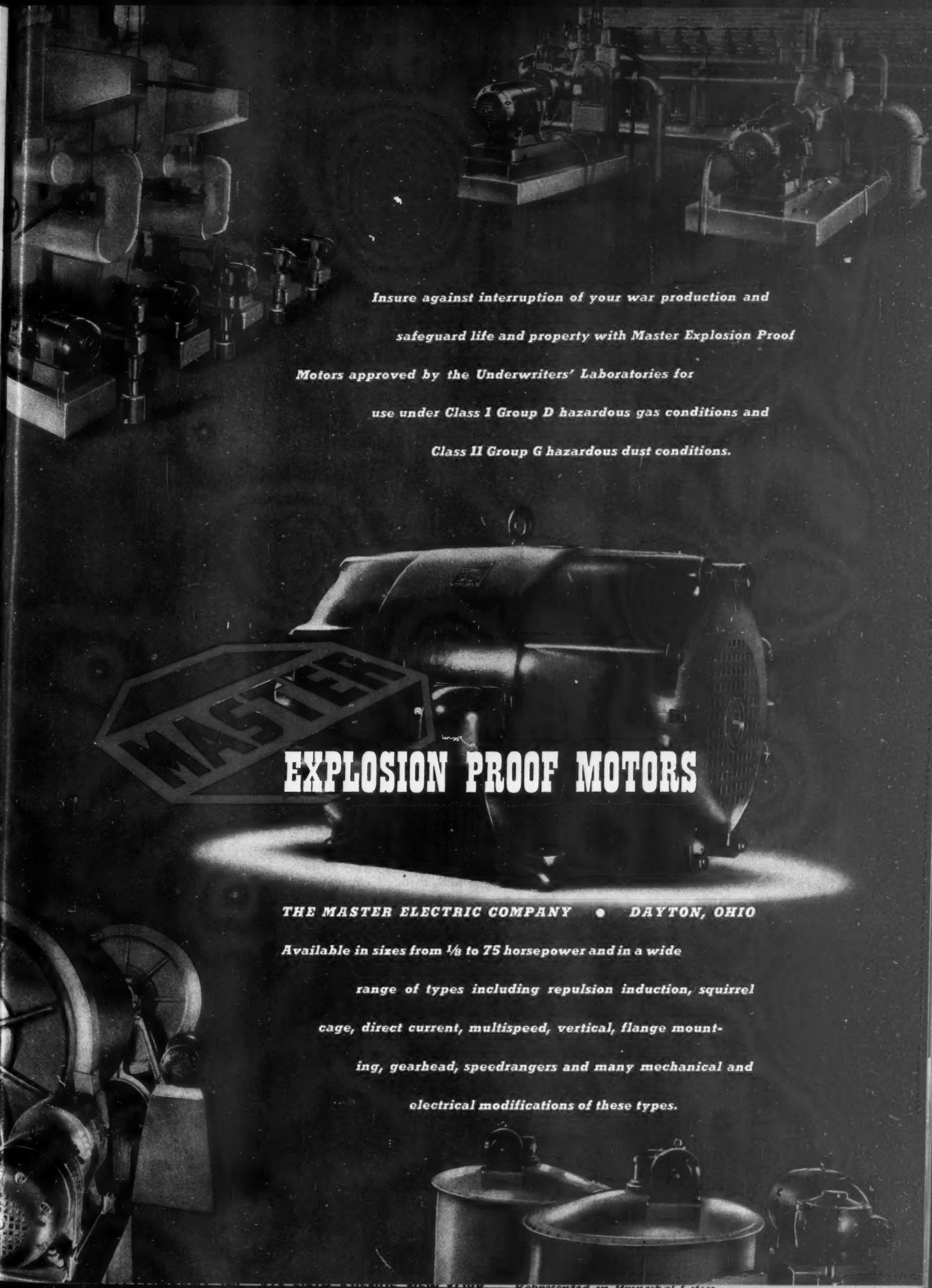
1. Treat your Wear-Ever Utensils with the same respect you give other fine equipment.
2. Don't mistreat them by needless rough handling.
3. Clean your Wear-Ever Aluminum thoroughly and properly.
4. Flatten out accidental dents to avoid excessive wear. Place a wood block over dent and pound with a hammer.
5. Watch for loosening rivets and tighten them before it's too late.

TO CAUTION YOUR HELP, these and other reminders have been printed on 11 x 14-inch cards to hang in your plant. How many can you use? For these cards, or for advice on any special maintenance problems you may have, write THE ALUMINUM COOKING UTENSIL COMPANY, 301 Wear-Ever Building, New Kensington, Pennsylvania.

Wear-Ever Aluminum

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT OFF.

★ WHEN IT'S ALL OVER W-E WILL BE BACK! ★

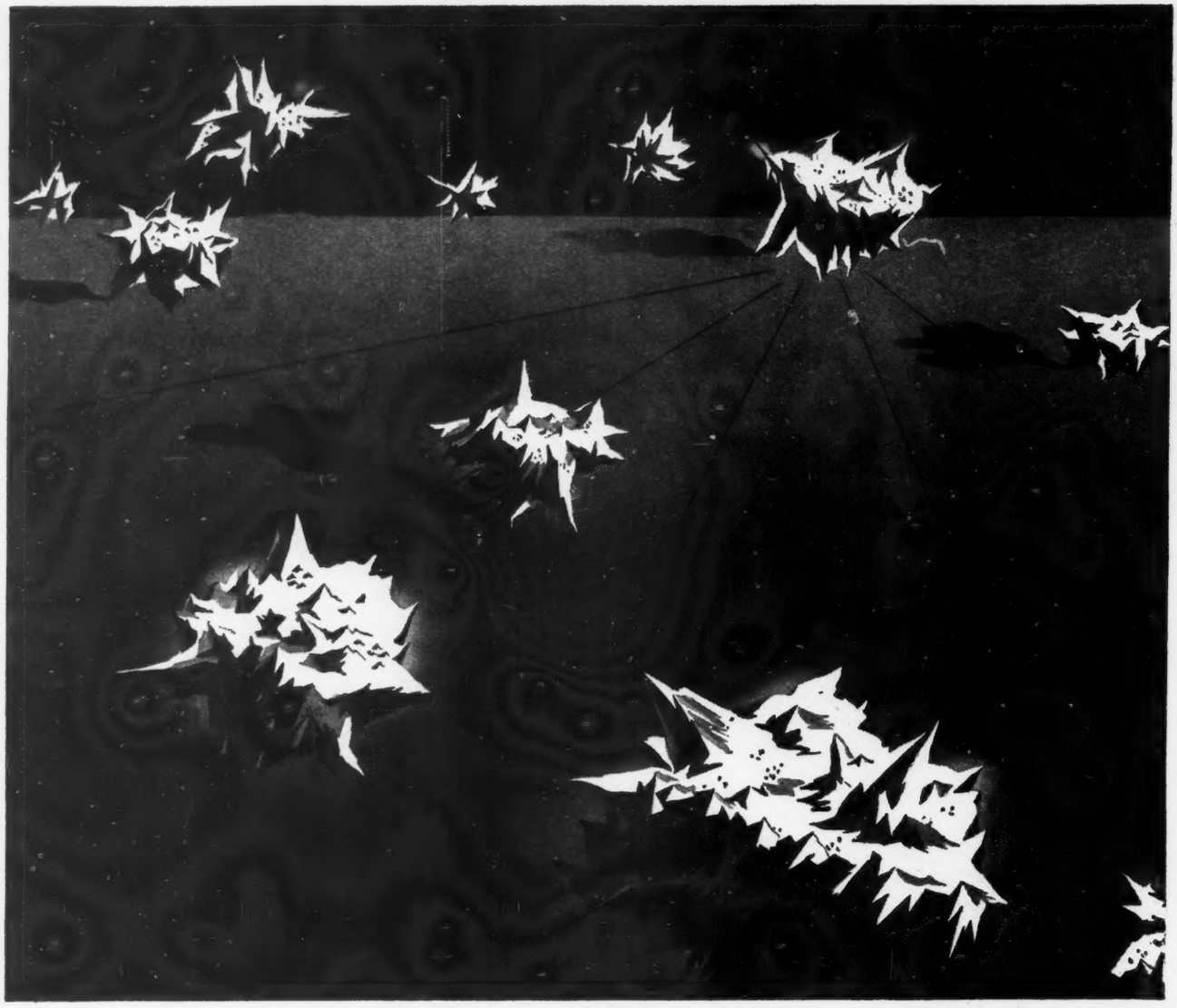


Insure against interruption of your war production and safeguard life and property with Master Explosion Proof Motors approved by the Underwriters' Laboratories for use under Class I Group D hazardous gas conditions and Class II Group G hazardous dust conditions.

EXPLOSION PROOF MOTORS

THE MASTER ELECTRIC COMPANY • DAYTON, OHIO

Available in sizes from 1/8 to 75 horsepower and in a wide range of types including repulsion induction, squirrel cage, direct current, multispeed, vertical, flange mounting, gearhead, speedrangers and many mechanical and electrical modifications of these types.



SABOTAGE ... *from the air*

Sharp . . . jagged . . . destructive! Not bombs. Merely little specks of dust . . . but far from harmless, as high-powered microscopes would show.

It is easy to imagine what damage these hard, jagged particles can do to precision finished bearing surfaces in equipment ranging from delicate instruments to heavy machines. When a highly finished part must be scrapped because of dust-damage, much more is lost than just a piece of metal. Many hours of expensive, painstaking labor are completely wasted.

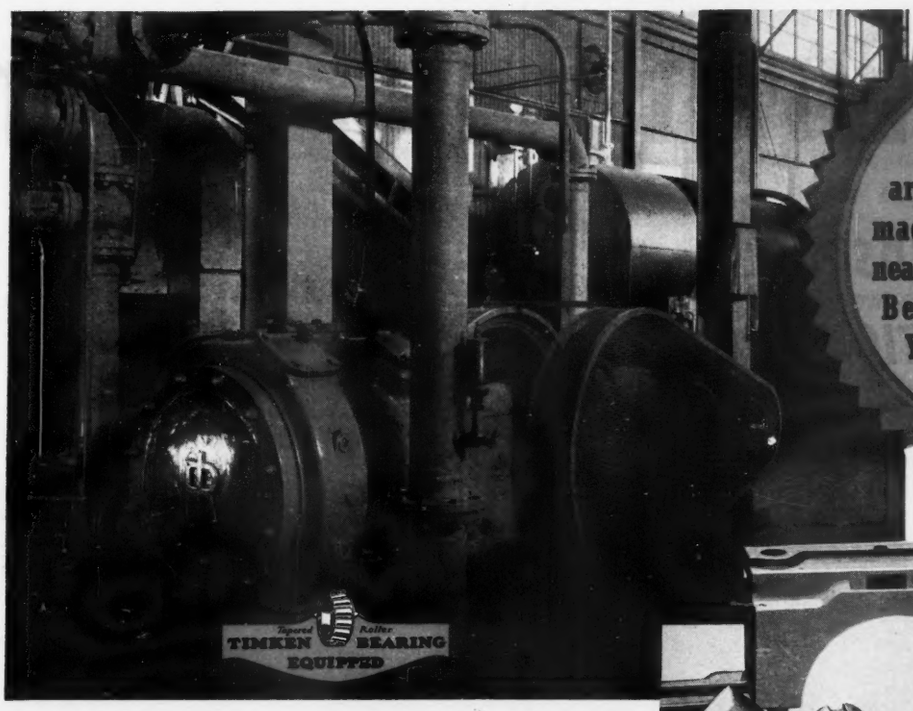
One of the best defenses against dust-sabotage is air conditioning . . . the specially designed kind of air conditioning which, through efficient air filtering and accurate control of temperature and humidity, is making possible precision tolerances never before attainable.

General Electric has taken an outstanding part in the development of this new air conditioning. Already, the war has taught us how to make equipment more compact, more flexible, and far more efficient. Required "climates" are faithfully reproduced. When the war is over, air conditioning . . . better, cheaper, more universally used . . . will do much to make the world of the future happier and more useful for everyone. Then, as now—General Electric will be a leading source of all kinds of air conditioning.

Air Conditioning and Commercial Refrigeration Department, Division 431, General Electric Co., Bloomfield, N. J.

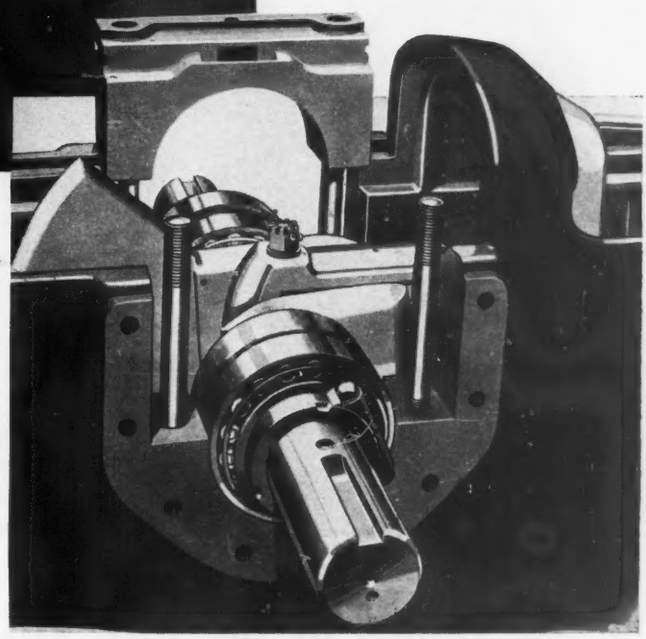
Air Conditioning by

GENERAL ELECTRIC



Ingersoll-Rand Class ES Dry Vacuum Pump widely used in the process and food industries. Equipped with Timken Bearings on the crank shaft.

Raise the performance standards of your processing machines to bring Victory nearer. Use as many Timken Bearings as possible. You will benefit after victory, too.



Application of Timken Bearings on the crank shaft of the Ingersoll-Rand Class ES Vacuum Pump.

Keep every rotating part moving speedily, smoothly, accurately, enduringly; minimize the time required for lubrication and maintenance by installing Timken Bearings at every suitable position.

A few Timken Bearings are better than none in any piece of equipment, but the more there are the greater the protection against friction; wear; radial, thrust and combined loads; and misalignment of moving parts—and thus the better the performance.

Engineers who know this and carry it out give their companies a two-fold advantage; better machines and *better selling* machines — for "TIMKEN" is the best-known name in bearings wherever wheels and shafts turn.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

HELP ASSURE VICTORY

Buy War Bonds. Conserve Rubber. Eliminate Unnecessary Travel. Use the Telephone Only When Important. Salvage All Scrap and Waste Material.

All Timken Bearing production now goes into fighting machines. However, the Timken Bearings in your motor vehicles or industrial machines will see you through the emergency—and beyond it—if you make sure they are lubricated and inspected regularly.

HERE is Buying Information-

NOW IN THE HANDS OF FOOD PRODUCTION EXECUTIVES!

The 5th Edition of the ONE VOLUME Buying Guide and Reference Source — FOOD INDUSTRIES 1943 CATALOGS & DIRECTORY

● This edition is in the hands of more than 12,000 processing and production engineers and executives in America's important food plants. It is being used for quick reference to help meet today's emergency demands for greater production of high quality foods, greater conservation of essential material at less expense.

War Brings a Revolution in the Food Processing Industry—To meet present and future demands plants must be expanded to feed the United States — armed and civilian forces — and a large part of the rest of the world.

Fixed standards of quality must be maintained (Government dictated) regardless of shortages of processing equipment, packaging material and supplies and personnel.

Pace must be kept with technological improvements in all phases of food production. The sudden and tremendous demand for dehydrated, compressed and frozen foods is changing factory routine in hundreds of plants. The Directory is planned to be helpful in supplying wanted information.

Helpful Buying Information—"... it gives us a chance to compare equipment from different companies, and I have found equipment listed that I did not know existed. It has been a real help all the way through."—quoting a typical comment from users of the Directory. The present edition will be as helpful in supplying buying information—with particular stress on the application of equipment and material and supplies required in new processes and packaging born of war needs.

HOW THE 1942 EDITION HAS HELPED FOOD PROCESSING MEN

★

"The Food Industries Catalogs and Directory was used as a general reference book and guide. This organization is now purchasing from most of suppliers listed."

H. G. Myers, Purchasing Bureau Buyer, Quality Bakers of America, New York, N. Y.

"In view of our diversified and extensive operations we use many different kinds of equipment. As time goes on will use even more. Should like to see continued and expanded when and convenient to do so."

F. W. Fetterman, Superintendent, Libby, McNeill & Libby, San Francisco, Calif.

"We often use Food Industries Catalog and Directory as a reference book when we are in doubt about a piece of machinery and we find the reference section of the book very valuable."

G. C. Freeley, Manager, Neosho Valley Cooperative Creamery Assn., Erie, Kans.

" . . . and find it extremely useful. One of the valuable features to me is the complete set of definitions and standards for food products adopted under the Food, Drug and Cosmetic Act up to the time of publication of your book."

F. C. Blanck, Quality Control Dept., H. J. Heinz Co., Pittsburgh, Pa.

" . . . would say that your 1942 Catalog and Directory has been in constant use by our organization."

L. E. Malcom, Canned Meat Production Dept., Kingan & Co., Indianapolis, Ind.

"We found the Food Industries Catalog & Directory valuable in our office and have passed on some of the formulas listed therein to our bakery trade. Kindly include us on your list for 1943 edition."

George Cockburn, Central Mercantile Co., St. Joseph, Mo.

"Greatest reference book our business ever had, don't see how any manufacturing concern selling to milk trade can afford not to have one."

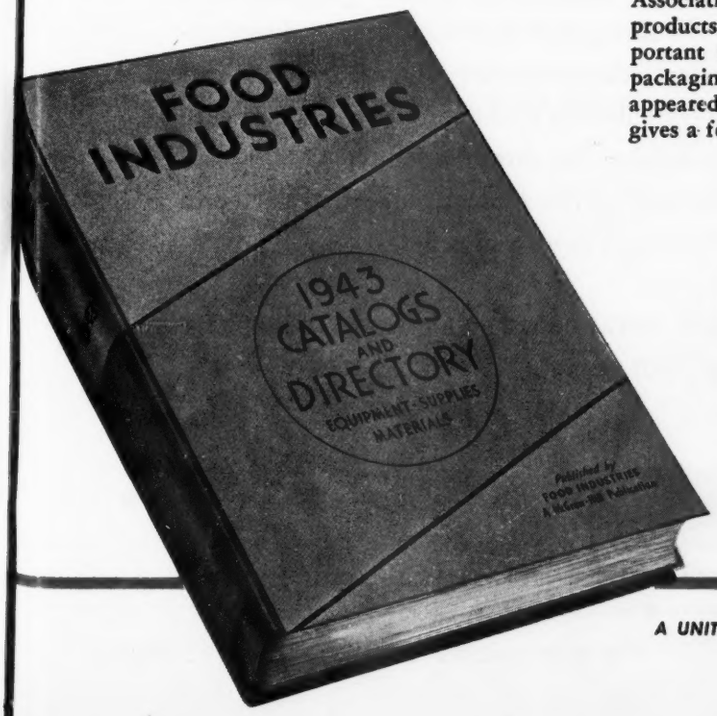
H. L. Smith, Wayne Cheese Co., Clyde, N. Y.

"We have referred to 16 different companies — some, from whom we have purchased materials — others we just wanted information in detail, and got it."

Donald C. Thayer, Production Manager, Food Service Company, Akron, Ohio

"We refer to this catalog frequently . . . In converting equipment to glass pack, I have looked at it a number of times. Accept our thanks for the book."

H. Schutt, Lindsay Ripe Olive Co., Lindsay, Calif.



● ***FACTS ON EQUIPMENT, MATERIALS AND SUPPLIES:***

SECTION 1
Single and Multi-page Manufacturers' Catalog Data

Turn to Section one—here are more than 100 pages of manufacturers' catalog information which picture and describe the products of leading suppliers of the Food industries. These pages give you sizes, speeds, capacities and other performance data which you can use to speed your production, cut costs.

● ***TO FIND THE FIRMS THAT MAKE A CERTAIN PRODUCT:***

SECTION 2
Classified Directory of Manufacturers

Here is the list of all manufacturers of machinery, equipment, and supplies. The names are classified alphabetically by product, with catalogers names in bold face type, giving page reference to the catalog section.

You will find more than 500 products used in the processing of foods. (In using this section always look for the principal word such as "Filter", "Mixers", etc.)

● ***NAME AND ADDRESS OF MANUFACTURER:***

SECTION 3
Alphabetical, Company Name, Address and Trade Name Index

A complete alphabetical listing of the companies making the products which are listed in Section 2. This gives a cross-index and further simplifies the use of the volume.

● ***CHECKING ON LEGAL ASPECTS OF YOUR PRODUCT:***

SECTION 4
Food Definitions and Standards of Identity

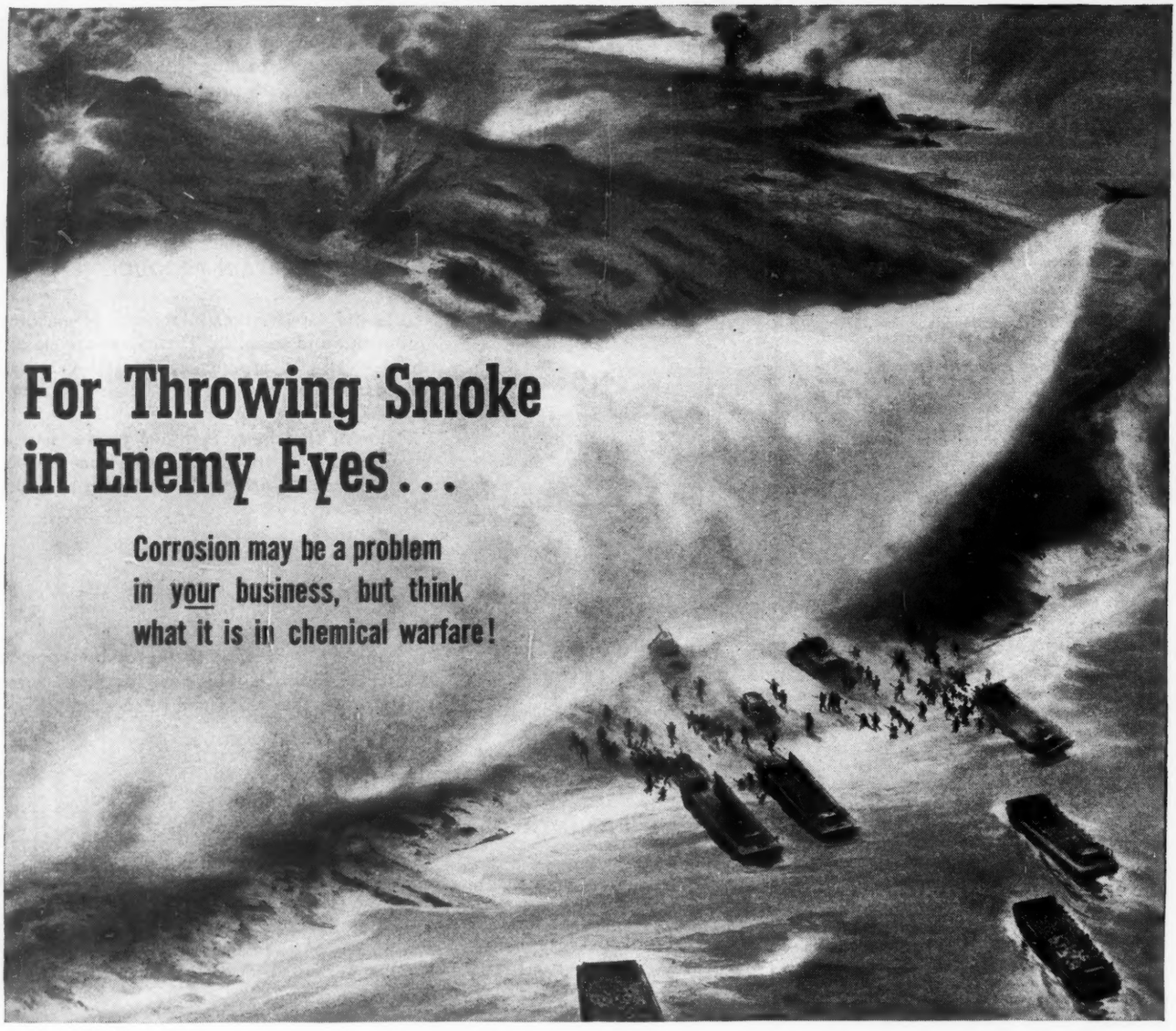
The 4th Section is valuable for reference. (a) Here are given Government definitions and standards of identity for foods. (b) List of Federal laws affecting foods, with the names of enforcement agencies. (c) Geographic list of State Food Law Enforcement Agencies.

Plus

(d) *National and Regional Trade Associations* as well as State and Local Associations. (e) *Food formulas* – over 200 of them for many varieties of products, reprinted from FOOD INDUSTRIES. (f) *Flow Diagrams* of 20 important food processes – through the stages of preparation, processing and packaging. (g) *Bibliography of Articles on Dehydrated Foods* which have appeared in FOOD INDUSTRIES. This is of particular war time interest and gives a forecast of post war sales opportunities as well.

FOOD INDUSTRIES CATALOGS & DIRECTORY

A UNIT OF THE McGRAW-HILL REFERENCE SERVICE, 330 W. 42d ST., NEW YORK, N. Y.



For Throwing Smoke in Enemy Eyes...

Corrosion may be a problem in your business, but think what it is in chemical warfare!

SMOKE SCREENS are used to shield our troop movements and save lives, or to disrupt movements by the enemy. Such screens involve the use of titanium tetrachloride. And that, as you may know, is an agent high up on the list of strong corrosives.

The same qualities that make Monel such a favorite for many kinds of equipment, its ability to resist corrosion combined with lasting strength, also make it extremely valuable in chemical warfare.

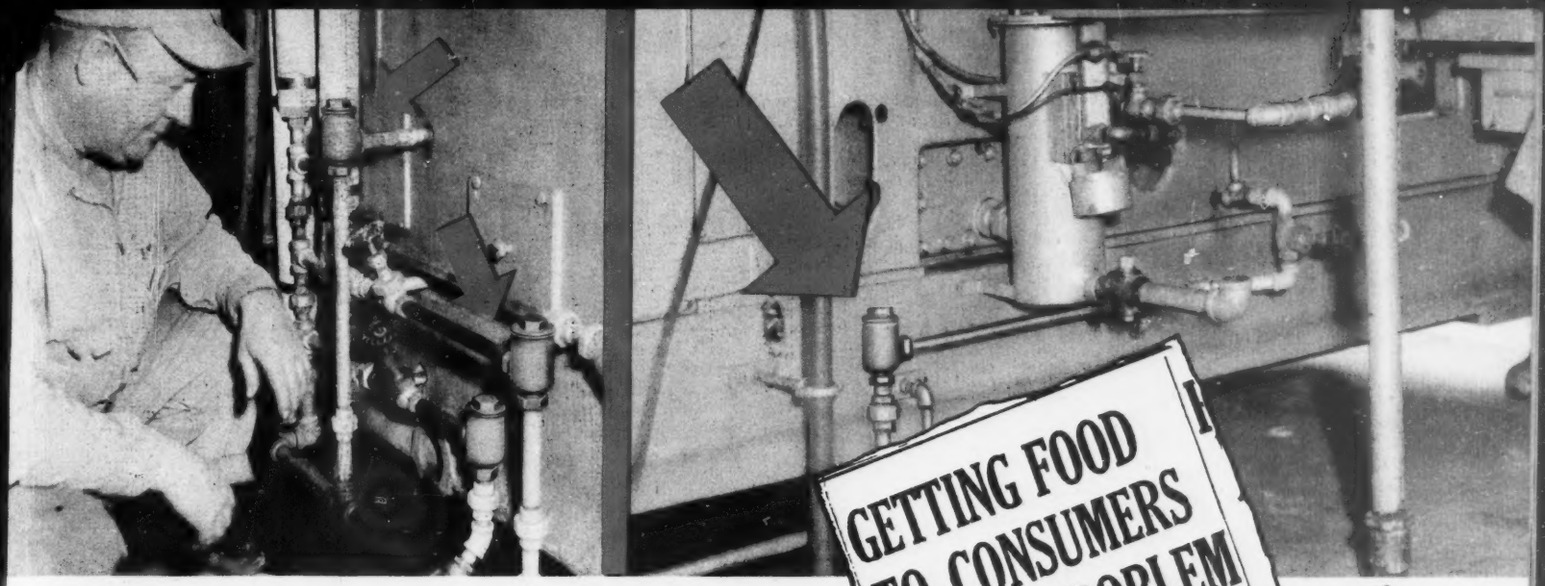
In this and in scores of other military applications on our many fighting fronts, Monel is contributing to the war effort. In the peace to follow, this durable, long-lived alloy will resume its place as an important factor in America's industrial progress.

THE INTERNATIONAL NICKEL COMPANY
67 Wall Street **New York, N. Y.**

★ ★ ★ ★ ★ **INCO NICKEL ALLOYS** ★ ★ ★ ★ ★

MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • "Z" NICKEL • NICKEL

Sheet... Strip... Rod... Tubing... Wire... Castings



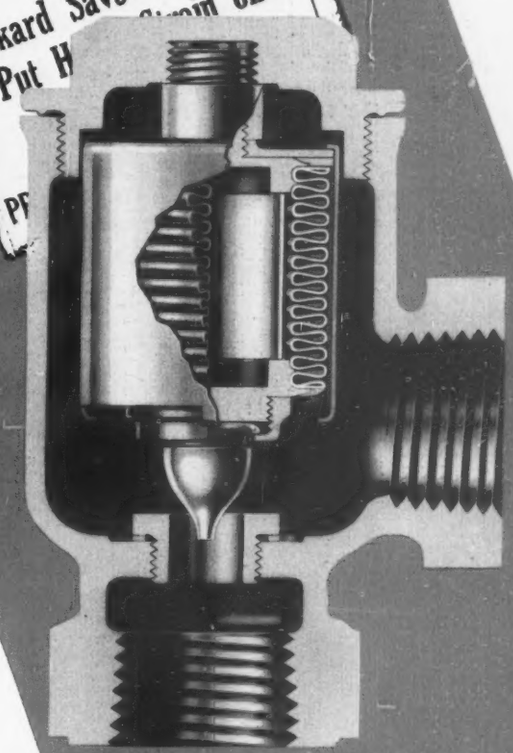
If it's a Steam-Process

SPEED UP WITH

SARCO No. 9 Steam Traps

Whenever you see a cluster of Sarco No. 9 Steam Traps you can be sure of several vital features in the equipment they serve.

1. No one steam coil can hold up another. They are all working at top speed.
2. No useful heat is escaping with the condensate. The No. 9 expels only the slightly cooled condensate.
3. There's no trouble starting up. It discharges all entrained air rapidly, being wide open when cool, which is also why it can't freeze.
4. Varying steam pressures will not affect the operation. No seats to change. It's the only thermostatic steam trap made for pressures up to 250 lbs.



The No. 9 has a powerful, snappy action due to the heavy wall, helically corrugated bellows made from flat blanks exclusively in the Sarco Factory at Bethlehem, Pa.

This trap has been carrying heavy loads in all types of process industries and on heating lines for a quarter of a century.

Try one in a tough spot and you will see the reason why.

SARCO Saves Steam

SARCO CANADA, LTD., 85 Richmond Street, West, TORONTO, ONTARIO

SARCO COMPANY, INC., 475 FIFTH AVENUE, NEW YORK

Representatives in Principal Cities

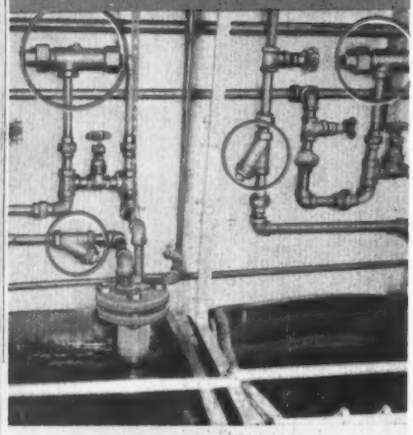
Simple

Temperature Controls for Industry

Elaborate equipment is not necessary to secure the advantages of automatic control of critical temperatures.

Sarco has made available simple, self-operated regulators which are providing adequate control on hundreds of applications at astonishingly low cost.

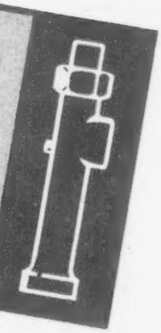
Take these three examples:



A manufacturer of records uses Sarco Thermotons on plating tanks.

1. At the cost of a good steam trap, the Sarco No. 87 Thermoton takes care of condensation removal and at the same time provides approximate temperature control of steam heated tanks, kettles or other small equipment. For the first time it has brought automatic control within the reach of small plating shops where it is used for all heated tanks, including washing and rinsing.

Catalog No. 550

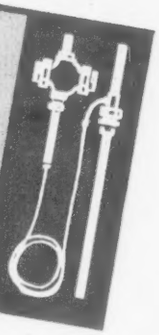


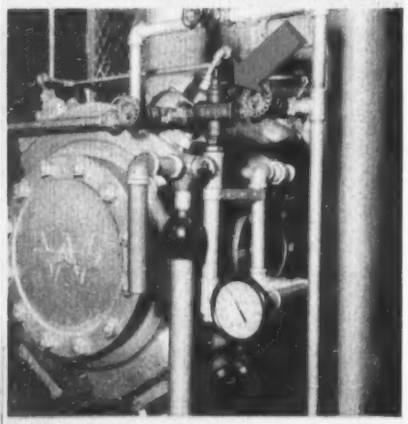
A textile plant tried one TR-21 Temperature Regulator and now has four.

2. Sarco type TR-21 self-operated temperature regulators are standard equipment on water and oil heaters, for all types of process work such as cooking, evaporating, drying, or degreasing; also for cooling controls and air conditioning.

Powerful liquid expansion systems provide gentle throttling control. Valves are packless — no stuffing boxes to leak or stick.

Catalog No. 600





he TR—40 Cooling Control saved 75,000 u. ft. of water a year in a chemical plant.

3. If you are interested in saving up to 50% of the cooling water used on air compressors, condensers, stills, internal combustion engines, or degreasers, you will want to investigate Sarco type TR-40 cooling control.

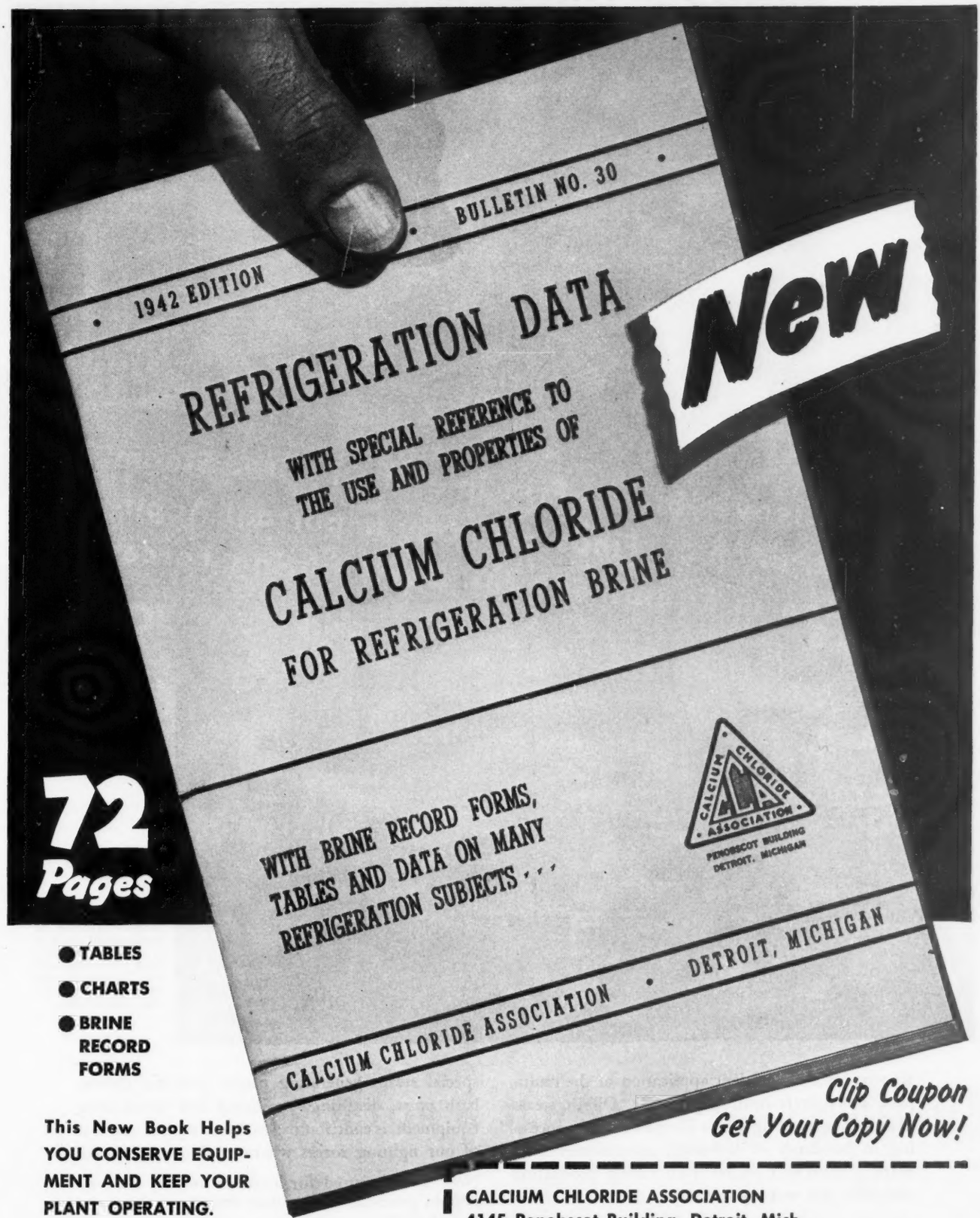
A low cost, rigid stem type, it is easy to install, prevents over-or under-cooling, and saves on lubricating oil as well as water.

Catalog No. 700 describes four different types in sizes from ⅜" to 8"

80% of all industrial temperature control problems can be solved by a simple self-operated Sarco Regulator or an inexpensive "on and off" Sarco Electric Control.

SARCO Saves Steam

SARCO CANADA, LTD., 85 Richmond Street, West, TORONTO, ONTARIO


BULLETIN NO. 30
1942 EDITION
REFRIGERATION DATA
WITH SPECIAL REFERENCE TO THE USE AND PROPERTIES OF
CALCIUM CHLORIDE
FOR REFRIGERATION BRINE
New
WITH BRINE RECORD FORMS, TABLES AND DATA ON MANY REFRIGERATION SUBJECTS . . .
CALCIUM CHLORIDE ASSOCIATION
PENOBSCOT BUILDING
DETROIT, MICHIGAN
CALCIUM CHLORIDE ASSOCIATION • DETROIT, MICHIGAN

72 Pages

- **TABLES**
- **CHARTS**
- **BRINE RECORD FORMS**

This New Book Helps YOU CONSERVE EQUIPMENT AND KEEP YOUR PLANT OPERATING.

Mail Coupon to

CALCIUM CHLORIDE ASSOCIATION
4145 Penobscot Bldg. • Detroit, Michigan

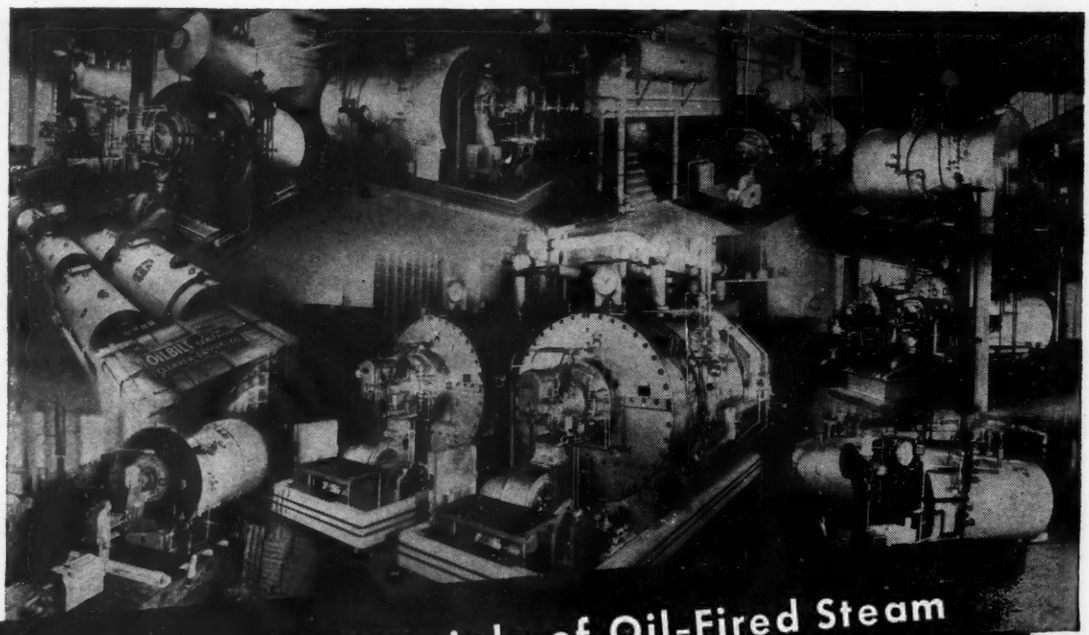
Clip Coupon Get Your Copy Now!

CALCIUM CHLORIDE ASSOCIATION
4145 Penobscot Building, Detroit, Mich.

Please send Bulletin No. 30 "Refrigeration Data and Record Forms" to address below:

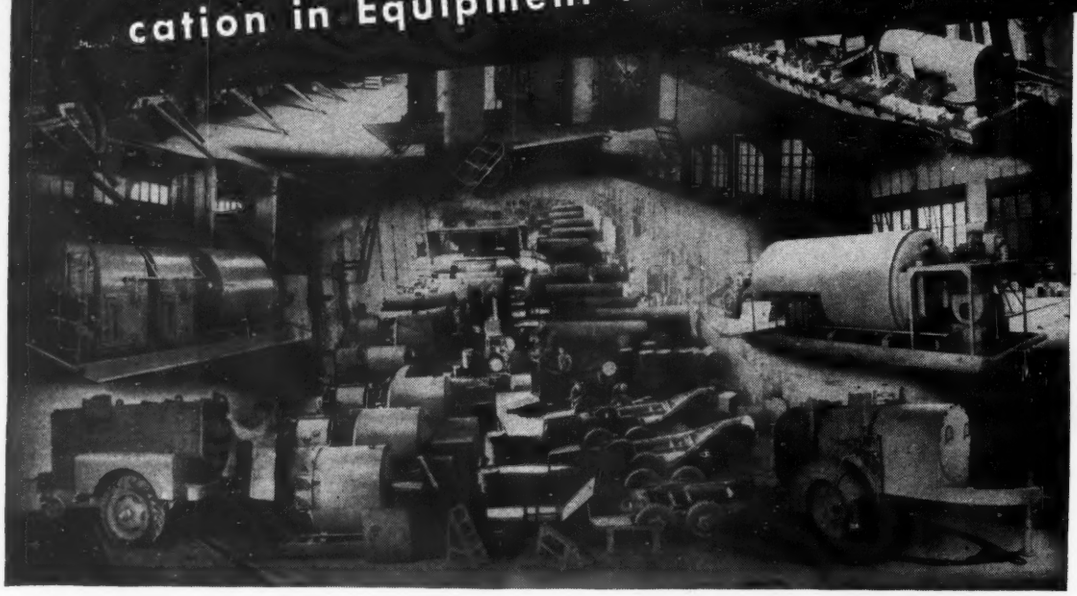
Name_____

Address_____



Reproduction of photo-mural, as shown in the Cleaver-Brooks offices, depicting representative Oilbilt steam plant installations.

The Cleaver-Brooks Principle of Oil-Fired Steam Generation . . . Finds a Vitally Important Application in Equipment for Our Fighting Forces



Reproduction of photo-mural which is a composite illustration of various types of Cleaver-Brooks equipment built for our armed forces.

Known for their efficient application of the multi-pass, down-draft heating principle, Oilbilt steam plants are providing steam for power and processing in hundreds of industrial establishments — helping them to meet record-breaking production schedules for war equipment.

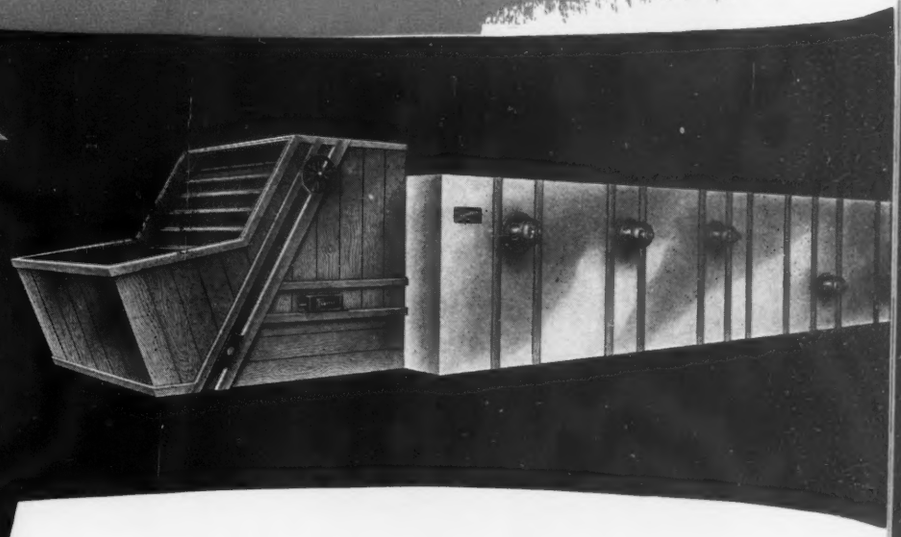
Mobile equipment, employing the same proven principle of firing with America's ideal fuel — *oil* — and including hot water heating equipment, special steam generating plants, portable shower bath units, distilling, sterilizing and disinfecting equipment, is contributing to the safety and comfort of our fighting forces wherever they are located.

Now manufactured for a nation at war, Cleaver-Brooks products will resume their peacetime service when Victory day comes.

CLEAVER-BROOKS COMPANY
5103 North 33rd Street • Milwaukee, Wisconsin

CLEAVER-BROOKS COMPANY • MILWAUKEE, WISCONSIN

FOOD DEHYDRATION - UNIFORM QUALITY - LOW COST

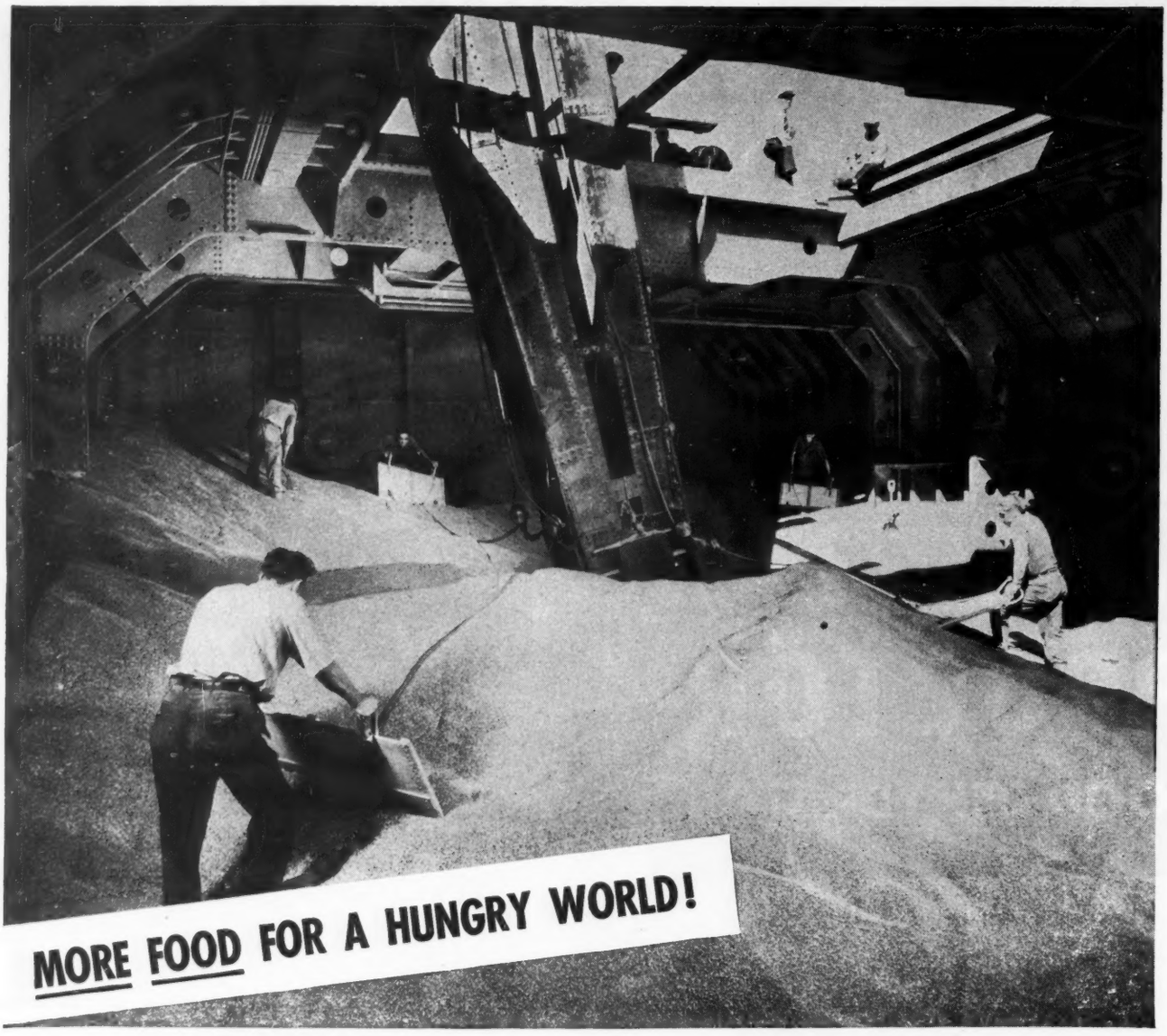


THE *New Design* PROCTOR FOOD DEHYDRATOR

1. Entirely automatic in operation.
2. Continuous flow of food products through dehydrator.
3. Flexibility for handling different food products.
4. Dehydrating conditions accurately controlled.
5. Minimum use of strategic materials.
6. No trays or trucks required.
7. Low operating costs.
8. Capacity up to 30 tons of raw product per 24 hours, requiring only one man to operate.

PROCTOR & SCHWARTZ • INC • PHILADELPHIA

● RICED, STRIP, JULIENNE, DICED OR CUBED POTATOES ● SLICED, DICED AND JULIENNE CARROTS ● DICED AND JULIENNE BEETS ● DICED TURNIPS ● DICED RUTABAGAS ● SHREDDED CABBAGE ● SWEET POTATOES ● MEATS AND OTHER FOODS



Protection of foodstuffs is of paramount importance in this crucial war year. Dow has long specialized in the development of materials, not only to protect food in storage against destructive conditions, but also to aid in its growing and processing.

These products represent the results of enterprising research spanning a period of more than fifty years. During this time, Methyl Bromide, a superior fumigation material, has been developed along with other special fumigants, and insecticides.

In addition to these important contributions to the war effort, Dow is engaged in the production of a vast variety of chemical products. Magnesium, the lightest of light metals is going in ever increasing quantities into our instruments of war. Dow plastics are also finding their way into important wartime applications. Dow pharmaceuticals, germicidal and fungicidal materials, synthetic aromatics, and a multitude of industrial chemicals are serving American industry to hasten the day of Victory.

METHYL BROMIDE

THE PENETRATING FUMIGANT

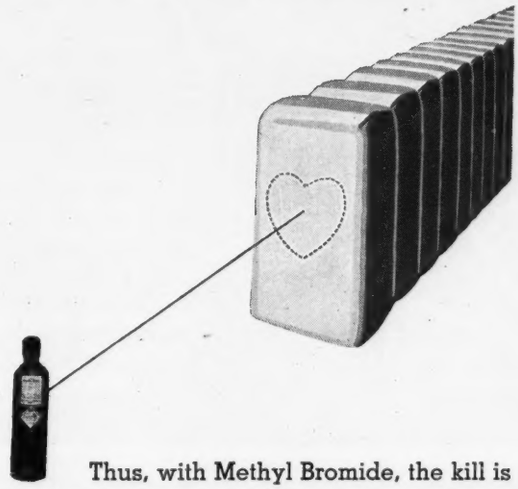
DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

A FUMIGANT THAT PENETRATES

In fumigations of all kinds, penetration is a point of primary importance. To reach only those insects and pests nearest the surface is not enough. For, if the fumigant does not effect a complete kill in the heart of every bag or package, the fumigation is practically worthless.

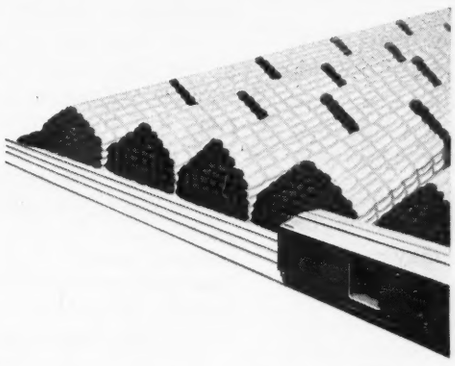
Methyl Bromide reaches into the very center of the "danger zone" where ordinary fumigants fail to go.



Thus, with Methyl Bromide, the kill is quick and complete in every stage of insect development—from egg to adult.

MEETS WARTIME NEEDS

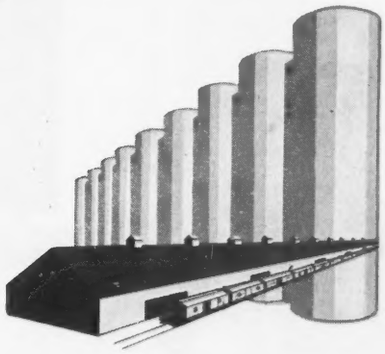
With valuable food supplies being stored under wartime conditions, special protection is more than ever necessary. Methyl Bromide has proved itself well



adapted to these emergency applications making "on the spot" fumigations entirely practicable. Through the use of a Dow-developed, plastic-treated tarpaulin, treatment of huge stores of material stacked out-of-doors or within large buildings not suitable for regular fumigation methods is made possible. Moreover, Methyl Bromide permits the fumigation of foods in the very box cars in which they are shipped. These methods save many valuable hours and protect precious food supplies from destruction.

FITS MANY FUMIGATION JOBS

Methyl Bromide possesses unique characteristics which suit it for a broad variety of applications. It is successfully employed in the fumigation of warehouses, mills and large buildings. It will readily penetrate to the center of a 140 lb. bag of flour as well as the largest of warehouse stacks.



Methyl Bromide is also used in vault fumigations which avoid in part or entirely the necessity of fumigating the entire building or warehouse.

DIRECTLY AND EASILY APPLIED

Methyl Bromide eliminates the need for complex and expensive equipment required by many fumigation materials. It is applied directly from small containers or convenient cylinders—entering the building or chamber without the aid of special pressure apparatus. When the fumigation is complete, Methyl Bromide's high diffusion rate makes possible rapid and thorough venting—releasing material for shipment in a comparatively short period.

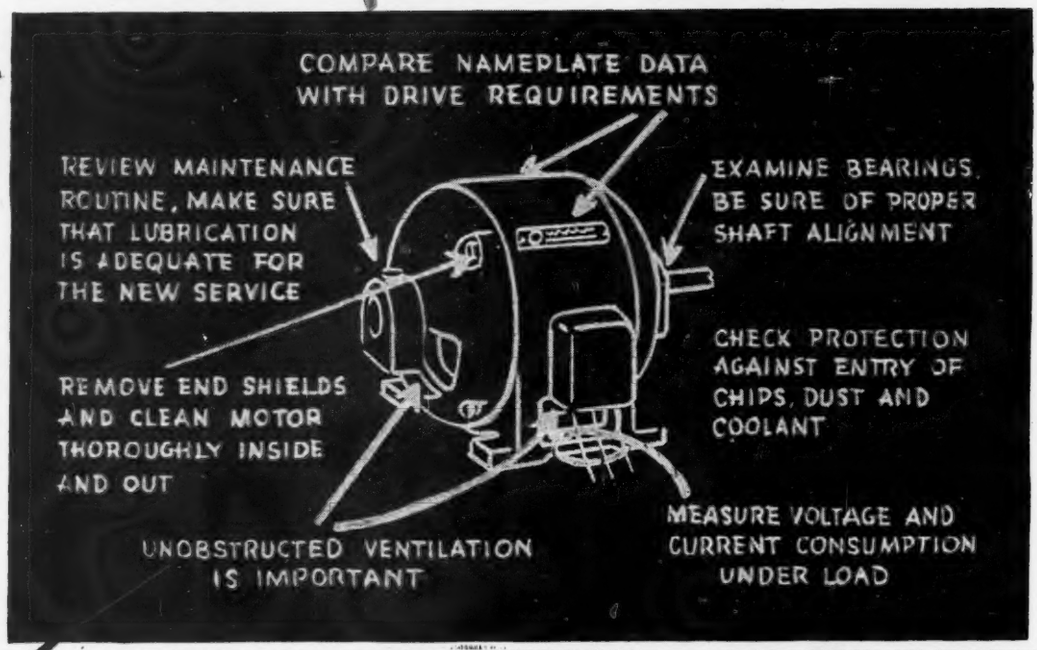
For complete information on specific fumigation methods, write to Dow today.

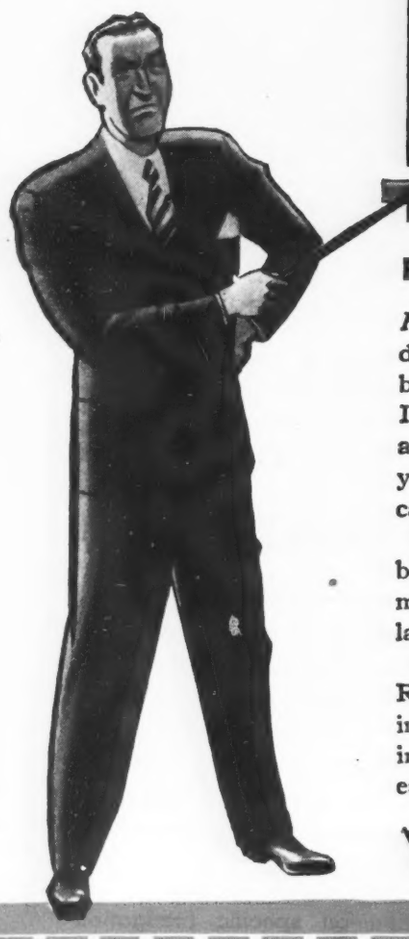
DOW

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York • Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle

IT'S TIME TO BE A CRANK ABOUT MOTOR CARE


COMPARE NAMEPLATE DATA WITH DRIVE REQUIREMENTS
REVIEW MAINTENANCE ROUTINE, MAKE SURE THAT LUBRICATION IS ADEQUATE FOR THE NEW SERVICE
EXAMINE BEARINGS. BE SURE OF PROPER SHAFT ALIGNMENT
CHECK PROTECTION AGAINST ENTRY OF CHIPS, DUST AND COOLANT
REMOVE END SHIELDS AND CLEAN MOTOR THOROUGHLY INSIDE AND OUT
UNOBSTRUCTED VENTILATION IS IMPORTANT
MEASURE VOLTAGE AND CURRENT CONSUMPTION UNDER LOAD



protect your production with this maintenance plan

Planned motor maintenance, keyed to today's loads and conditions, saves vital hours by forestalling future breakdowns and delay. In replacing hit-or-miss motor servicing with a regular schedule of trouble-*prevention*, you'll find real help in the new G-E publication, "How to Care for Motors."

The check list (right) tells what to do. This book tells how to do it, using well-proved methods that save time and help assure long-lasting motor service.

And, of course, your local G-E Motor Representative is always ready to aid you in putting these suggestions into practice, or in getting the new motors you may need for essential wartime projects.

The Navy "E", for Excellence, has been awarded to 92,780 General Electric employees in six plants manufacturing naval equipment.

1 Make sure that motors are selected to *match the job.* Install motors so they are properly aligned with the driven load and are easily accessible for regular inspection.

See "How to Care for Motors"

2 Keep motors free from dust and dirt. Establish a definite cleaning schedule.

See "How to Care for Motors"

3 Be sure that lubrication is frequent enough to take care of increased production. See that employees are instructed as to proper methods.

See "How to Care for Motors"

4 A general overhauling of hard-worked motors will add years to their life. If your motors haven't had an overhaul in the last year, try to arrange your schedule to permit one.

See "How to Care for Motors"

General Electric, Sec. R 750-179
Schenectady, N. Y.

Yes, send me a copy of "How to Care for Motors," GEA-2856A.

Name.....

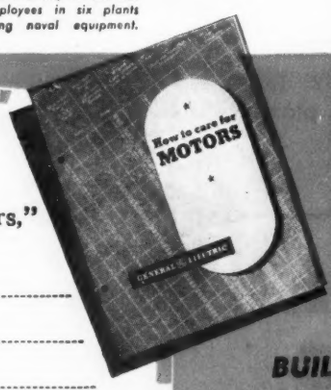
Title.....

Company.....

Address.....

City.....State.....

8080



HOW TO CARE FOR MOTORS

Every supervisor and maintenance man will find this book of value . . . it tells what to do to get the most out of motors, old or new. If you're setting up a maintenance program to keep up with today's unprecedented demands, or if you're "switching" motors from one job to another, or equipping machines with new motors, you'll find this booklet of helpful motor facts will save you time. Write for a copy.

BUILDER OF TRI/CLAD MOTORS

GENERAL ELECTRIC

TORTURE CHAMBER...

CAN kraft paper take it on the chin? How rough a handling will the container stand? That's what this Union Bag & Paper Corp. testing drum finds out.

Newly designed kraft paper packages and containers have to prove through this and other tests that they can replace those formerly made of scarce metal, burlap and other materials...materials no longer available for normal commercial use.

Just how well America's abundant kraft paper resources help manufacturers fill this need in our wartime economy is indicated by the fact that now kraft is serving in thousands of different uses!

WITH MULTI-WALL CONSTRUCTION,

Union Bag & Paper Corp. offers highly efficient methods of packaging and shipping agricultural, chemical, fertilizer, food and rock products...affords a decided weight and space-saving advantage.

IN THE FIELD OF WAR PACKAGING,

Union Bag & Paper Corp. is able to make kraft papers resistant to oil, grease and water, super-strong, non-scuff, flavor-sealing, fold-enduring, and eye-appealing...is able to make kraft containers that have one, or ALL of these important advantages.

Whatever your wartime container or packaging problem... no matter how difficult it may seem...consult

UNION BAG & PAPER CORP.

WOOLWORTH BUILDING NEW YORK, N. Y.

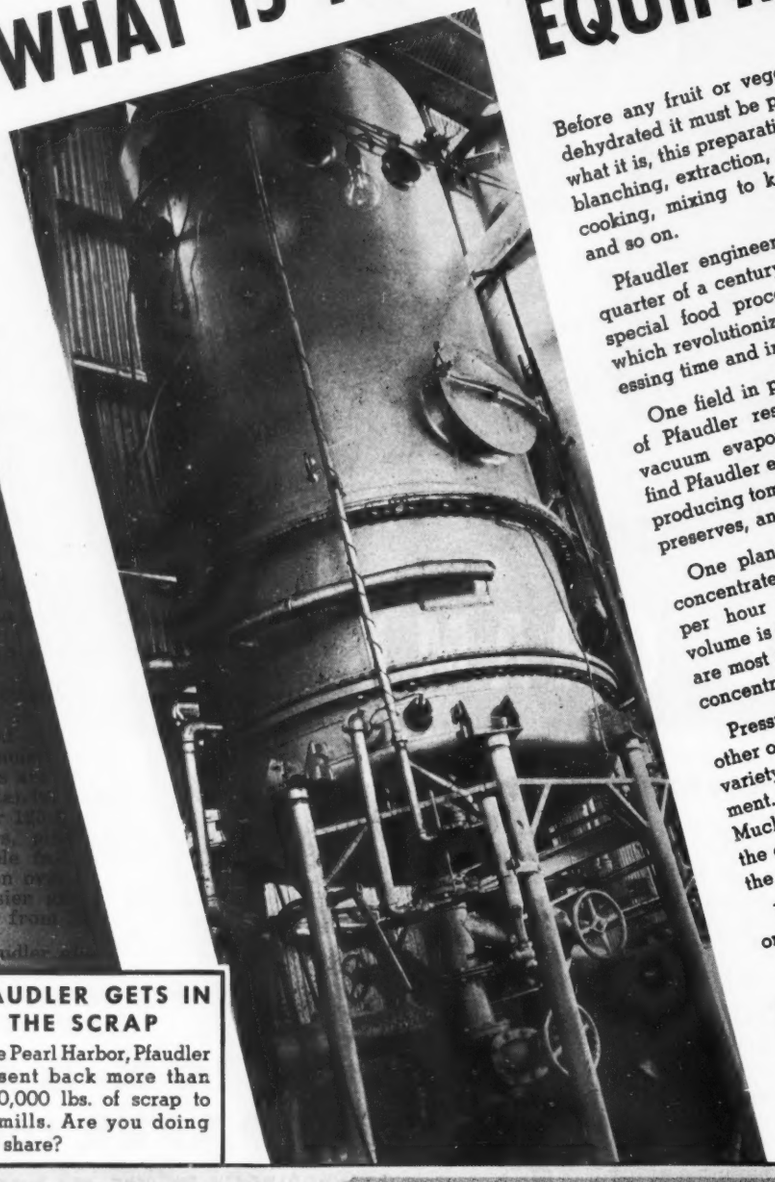
KRAFT PAPER—THE SERVICE UNIFORM OF AMERICAN PRODUCTS

PFAUDLER'S FLASHES

Published by THE PFAU[illegible]Y.

January, 1943 Vol. 4, No. 3

WHAT IS PRE-DEHYDRATION EQUIPMENT?



Before any fruit or vegetable product can be dehydrated it must be prepared. Depending on what it is, this preparation will include pressure blanching, extraction, reduction, preheating or cooking, mixing to keep solids in suspension and so on.

Pfaudler engineers have spent more than a quarter of a century in designing and building special food processing equipment, some of which revolutionized product quality, cut processing time and improved yield.

One field in particular has been the subject of Pfaudler research for years and that is, vacuum evaporation. Consequently, you will find Pfaudler evaporators in most leading plants producing tomato paste and puree, jams, jellies, preserves, and juices.

One plant producing a five to one tomato concentrate is using seven Pfaudler 12,000 lb. per hour tubular and coil evaporators. Its volume is the largest in the field. Its operations are most efficient. So if your operations involve concentration, see us. We can help you.

Pressure blanching, cooking and mixing are other operations for which we have built a wide variety of glass lined and stainless steel equipment. We'll be glad to send you our catalogs. Much of our line is standardized but most of the equipment being built today is designed for the special problems created by the emergency.

We are here to help you and that we can do only if you let us know what you want.

THE PFAUDLER CO.
ROCHESTER, N. Y.

PFAUDLER GETS IN THE SCRAP

Since Pearl Harbor, Pfaudler has sent back more than 1,000,000 lbs. of scrap to the mills. Are you doing your share?

FOOD PROCESSING ENGINEERS AT YOUR SERVICE — PFAUDLER — GLASS-LINED & STAINLESS STEEL PROCESSING EQUIPMENT

What the Pueblos found out about packaging

THE early Pueblo Indians of our great Southwest were the original cliff dwellers. They solved their "packaging problem" by living up in the air.

Pueblo cliff dwellings hugged the sheer cliff sides, backed up against towering walls. Enemies couldn't attack from the rear—the back of the house was protected. So was the front of the cliff dwelling, because the only access was up the cliff side, where the Pueblos could keep close watch.

But this double protection from human enemies was not all the Pueblos did. They found out that their "package," exposed as it was to the sun, wind, and rain, needed still more protection. So they covered their cliff dwellings with a mixture of burned gypsum, to protect them from erosion. That's how they improved their "package," and made it a real success.

Improving packages is an important part of Continental's service. We know that packages which are sturdy, good-looking, and specifically designed to do a job, help to make the sales curve zoom. That's why Continental has become known as packaging headquarters for industry.

Today, millions of cans for America's civilian food supplies, for Army, Navy rations, for beleaguered nations, are rolling out of Continental plants. So are other vital things for Uncle Sam's needs. All are packages to protect America!

Looking into the future we see many new packages—ideas which must be held until another day. But, for those who are planning ahead, we offer the services of our packaging engineers, research men and designers. They will be glad to work with you.

What will be the PACKAGE of the FUTURE?

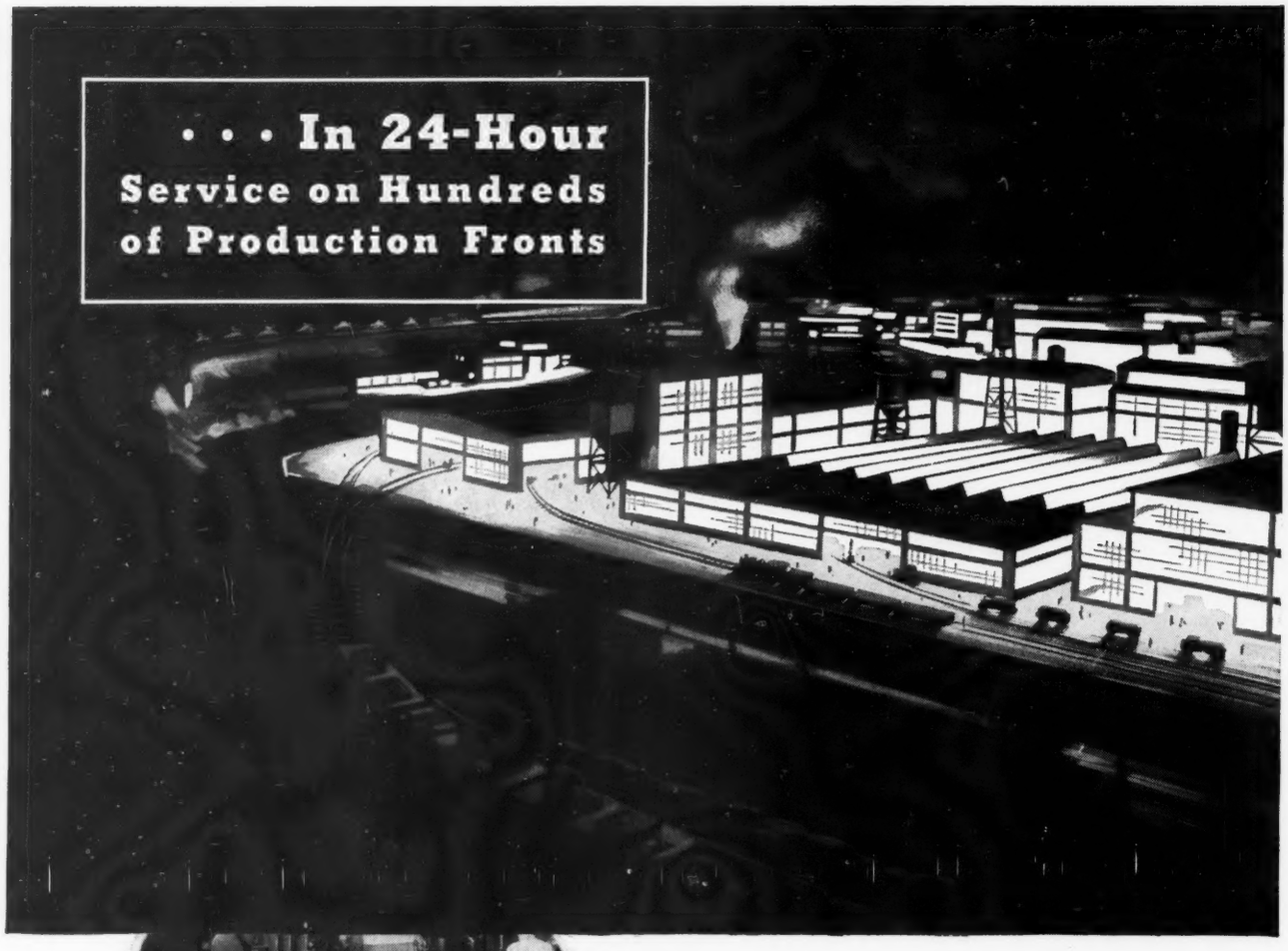
The package of the future will be the package that best meets *all* these 10 important points:

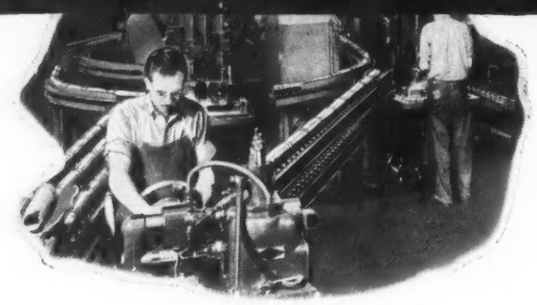
1. Protects against light, heat, and dirt.
2. Does not chip, break, or tear.
3. Is adaptable to *highest* speed filling operations.
4. Is economical to pack, ship, and handle.
5. Light weight, compact, no waste space.
6. Moisture and vapor proof, impervious to temperature changes.
7. Easy and convenient to display, sell.
8. Available in wide variety of sizes, shapes, styles (over 500).
9. Offers maximum convenience and safety in consumer usage.
10. Permits high processing temperatures, certain hermetic sealing.

These points made the metal container *first* in packaging. If there ever is another package that has *all* these qualifications, we'll be making it!

CONTINENTAL CAN COMPANY

Packaging Headquarters for Industry





ALL during America's conversion to wartime production, Standard Conveyor engineers were hard at work in foundries, munitions plants, steel and brass mills, aviation machine shops and scores of other plants . . . helping production executives to plan and install conveying equipment. For production men knew that experienced Standard engineers could quickly interpret their requirements . . . specify, or if need be—design the best types of power and gravity conveyors for handling particular types of commodities.

And just as Standard engineers rose to the needs of today's all-out war effort, they will respond with equal skill to the changing requirements of the future.

★ ★ ★

If you are producing war material or other products regarded as necessary to the war effort, Standard Conveyors are available for your handling needs. Write Dept. FI-1 for full information.

STANDARD CONVEYOR COMPANY

General Offices: **NORTH ST. PAUL, MINN.**

★ ENGINEERED FOR FASTER PRODUCTION ★

CUNO AUTO-KLEAN will protect these products from foreign solids

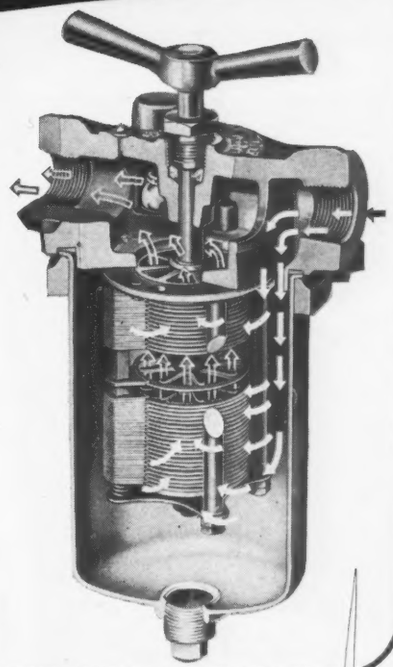
- Baby Foods
- Molasses
- Jellies and Preserves
- Candy
- Salad Dressings
- Cocoa Butter
- Oleomargarine
- Fruit Juices and Syrups
- Tomato Catsup
- Mustard
- Peanut Products
- Chocolate
- Lard Compounds and Substitutes

which means:

"Don't buy any more of that brand, Mom ... it's lumpy!"

What's the secret of *invariable smoothness?* We all know how hard it is to keep out *occasional* lumps and hardened particles; they get by — and often *we may never know it!*

How do *you* manage to keep your liquid or semi-liquid foods always *smooth?* Are you *insuring* against occasional lumps and impurities, the easy, efficient, low-cost way — with Cuno "Filter-Fine" Strainers?



Cuno Auto-Kleans are Non-Collapsible, Completely Controllable, and Continuously Cleanable without Interrupting Flow

Take a look at the diagram for a quick view of a new, *never-failing* straining method. The metal filter discs *cannot* collapse, whereas wire screen strainers are apt to break and puncture. You can get the *exact degree of fineness* you want — all solids larger than specified will be broken up or removed. And Cuno Auto-Kleans are *non-stop strainers:* turn the handle — by hand or motor — and you "comb out" accumulated solids without interrupting flow. Write for "Quick Facts". Get the whole story!

KEEP FLOW ON "GO" WITH

CUNO

THE "FILTER-FINE" STRAINER

CUNO ENGINEERING CORPORATION
401 South Vine Street, Meriden, Conn.
Send me the free booklet, "Quick Facts".
NAME.....
COMPANY.....
ADDRESS.....
Product to be strained.....

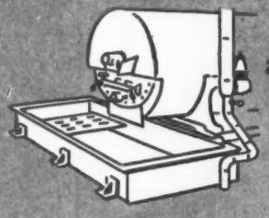
FOOD for the BOYS PROVIDES "FOOD FOR THOUGHT!"

Under the impetus of war advances in manufacturing technique are rapid. Developments that take years in normal times occur almost over night. These developments are certain to reshape production methods and equipment.

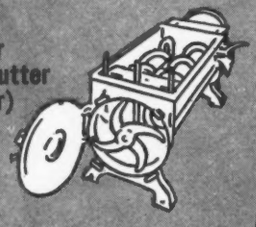
Cutting and Mixing will remain essential steps in the preparation of foods, however . . . regardless of the form of the finished products.

That is why, notwithstanding the fact that Hottmann equipment is available today only for essential war-time manufacture, we suggest that you avail yourself of our knowledge and skill and our 28 years' experience in the design and manufacture of food mixing and other types of processing equipment.

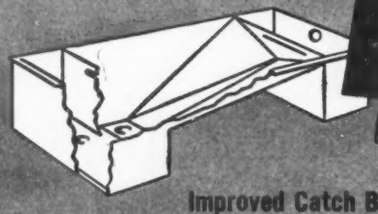
We are prepared to consult with you, to make recommendations, to help you formulate plans to meet post-war conditions.



Fat Melters and Percolators



Kutmixer (Combined Cutter and Mixer)



Improved Catch Basin

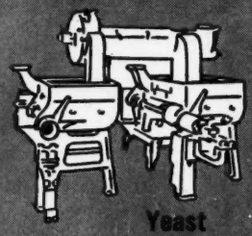
Now is the Time to Work Out Tomorrow's Mixing Problems

New problems in manufacture and new methods for more efficient and more economical production are certain in an America which will be obliged to feed many more millions of people than ever before in the post-war years.

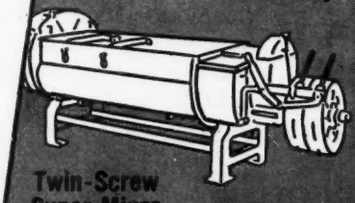
Let us help you plan, now, to meet these problems. Consultation is invited.

PUT YOUR MIXING PROBLEMS UP TO

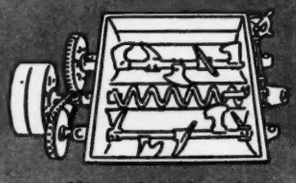
HOTTMANN



Yeast Machinery



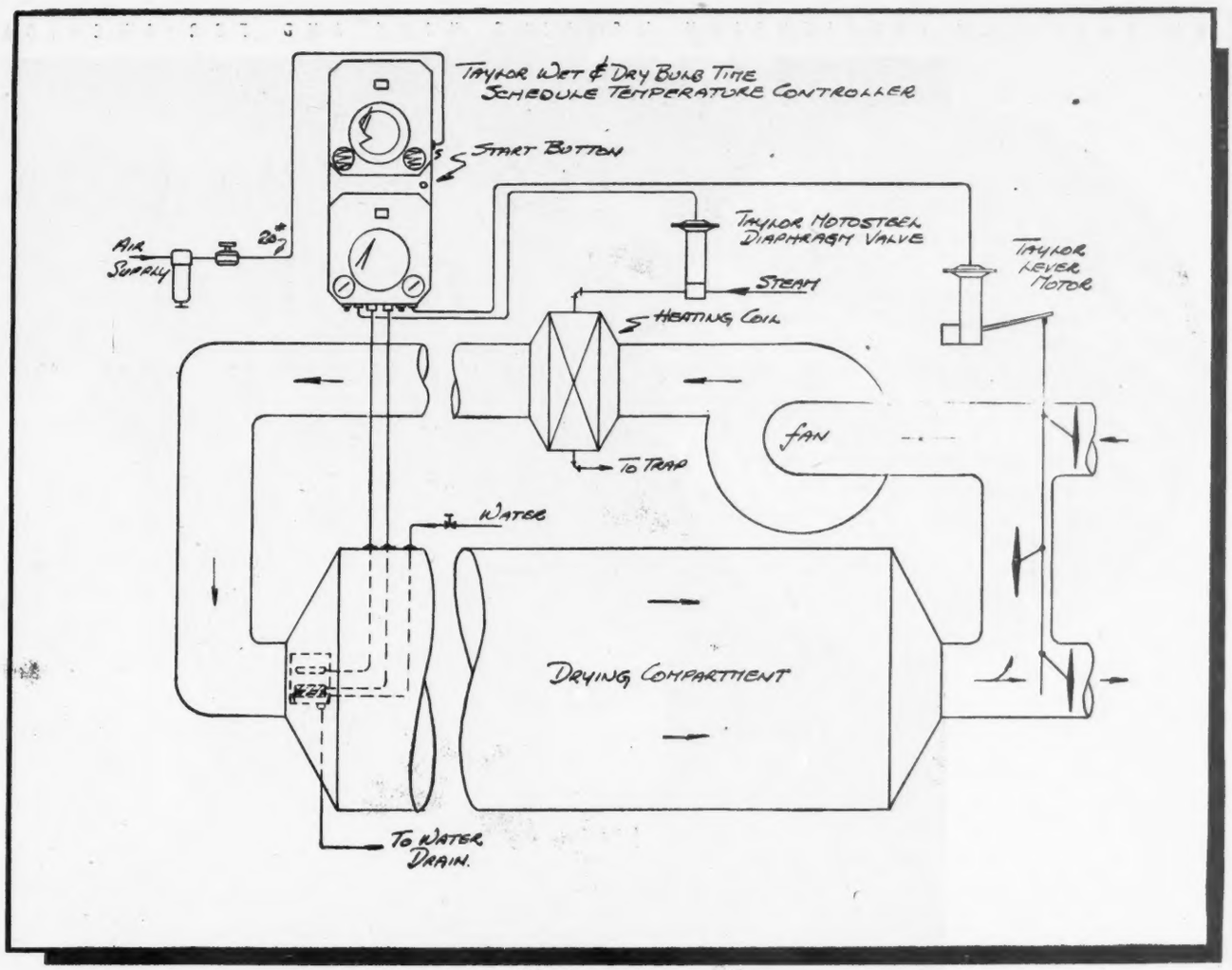
Twin-Screw Super Mixer



Mixer, Interior view

THE HOTTMANN MACHINE COMPANY

3325-47 East Allen Street • Philadelphia, Penna.



When you go into dehydration, you'll need TAYLOR AUTOMATIC CONTROL!

THIS drawing shows a typical instrumentation setup for a compartment type food dehydrator.

But whether you decide on a compartment, tunnel, continuous, vacuum or rotary type of dryer, you'll save a lot of headaches by starting with the right kind of automatic control.

Whatever dryer you select, you can get it ready-equipped with Taylor Instruments, direct from the dryer manufacturer. If you've been in the canning business long, you already know the value of Taylor accuracy. And Taylor has been supplying controls for food dehydration, too, right from the very start!

For atmospheric compartment dryers, we recommend Taylor Fulscope Wet-and-Dry Bulb Temperature Control with Automatic Reset.

For vacuum dryers, we recommend Taylor Fulscope Absolute Pressure Control for vapor space, and Taylor pressure or temperature control for heating surfaces.

For atmospheric tunnel dryers, we recommend for each zone, Taylor Fulscope Wet-and-Dry Bulb Temperature Control, plus a Taylor valve for steam and a Taylor Lever Motor for damper operation.

Blancher control is important too—and Taylor engineers licked this problem long ago, as most food processors know.

* * *

Call the nearest Taylor Office. Let your Taylor Field Engineer go over your setup thoroughly and help decide what instruments are best for *you*. Or, *specify Taylor Instruments when you order your drying equipment.* Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording, and controlling temperature, pressure, flow, humidity, and liquid level.*

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

★ KEEP ON BUYING U. S. WAR BONDS AND STAMPS ★

AN AMERICAN INSTITUTION WORKING WITH AND FOR AMERICA

Sabotaging Enemy FOOD Saboteurs

With food and nutrition so essential to winning this most important of all wars, it is imperative to combat every form of possible harm to the preservation and conservation of America's nourishing foodstuffs. Spoilage, shrinkage and contamination are unseen enemy food "saboteurs" that can cause great damage to our cause. To defeat them, Rhinelander's research laboratories and production staff labor unceasingly to develop and produce constantly improved protective packaging papers. National Defense starts with safeguarding the appetizing and nutritional food values necessary to a fighting Nation's health and vitality.

Folke Becker

PRESIDENT
RHINELANDER PAPER COMPANY

RHINELANDER
PROTECTIVE PACKAGING
Papers

FROM THE BEST THAT'S MADE TO THE CHEAPEST THAT'S GOOD

Genuine Greaseproof
Coffee Bag Papers
Confectionery Papers
Cereal Wrapping Papers

Laminated Greaseproof Papers
Lard and Shortening Liners
Bakery Product Wraps
Coated Food Packaging Papers

Cracker Box Liners
Greaseproof Innerwraps
Glassine Papers, Plain, Colored & Embossed

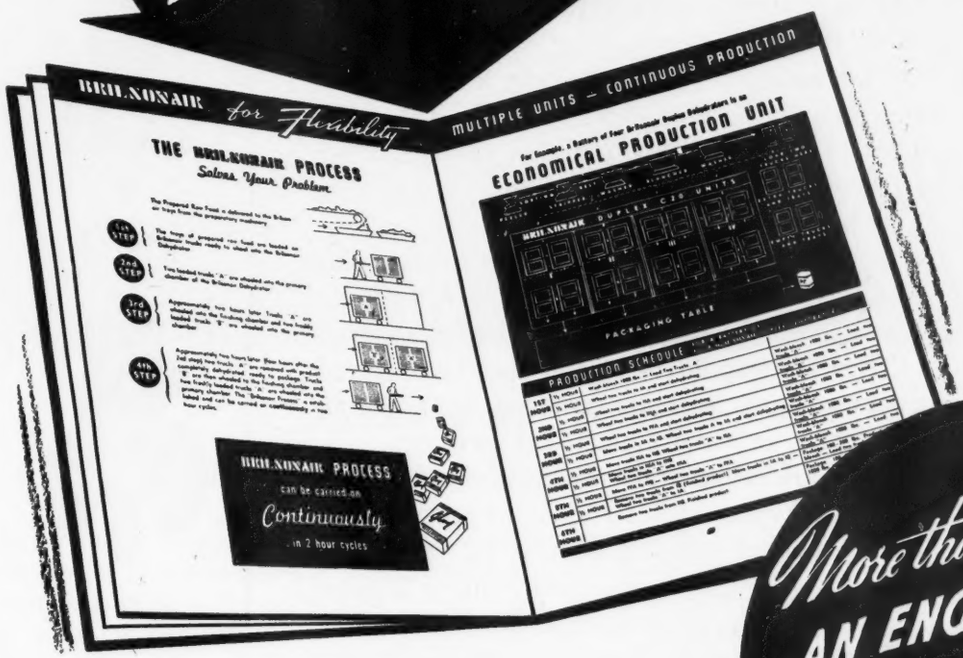
Wax Laminated Glassine
Opaque Label & Bag Glassine
Packing Industry Wrappings—and Specialties to order

RHINELANDER PAPER COMPANY • MILLS AT RHINELANDER, WISCONSIN, U.S.A.

These 12 pages TAKE THE MYSTERY OUT OF FOOD DEHYDRATION

This New Brilsonair Catalog is "MUST" reading for Dehydrators of Vegetables and Fruits. The Brilsonair Process is a sound, proved Engineering Principle that deserves most serious consideration. It offers an Engineering approach to **Today's and Tomorrow's** problems. It assures continuous quality production in 2-hour cycles; laboratory perfection in your plant; low initial cost; and maximum quality production per dollar of investment . . . all with Triple Flexibility of Product, of Positive Automatic Control and of Plant Layout.

"More than a machine — an Engineering Process" is sound logic . . . the Brilsonair is a scientific contribution to the modern advanced tempo of food dehydration. We promise you that your reading of this catalog will greatly reward you for the small effort of writing for it.



More than a machine
... AN ENGINEERING PROCESS
TODAY'S ANSWER TO *Quality* DEHYDRATION
Quickly AVAILABLE

BRIDGES-WILSON CORPORATION

206 Mass. Ave., ARLINGTON, MASS.

BRILSONAIR PROCESS

Flexibility of PRODUCT · CONTROL · PLANT LAYOUT

How ALCO Solenoid Valves

May Help You Solve a Manpower Problem

In these days of labor shortages, it is possible that many valves and controls in your plant, now operated manually, could be opened and closed *automatically* with Alco Solenoid Valves. You are assured of dependable, accurate performance with a definite saving in manpower or man-hours.

Alco Solenoid Valves are electrically operated valves drawing 8 to 15 watts when open. They close automatically under pressure. They are designed to control the flow of water, air, light oils, steam, or any liquids which will not attack bronze, steel, or stainless steel. For refrigeration systems, they are furnished for Freon, Methyl Chloride, Brine, and Ammonia.

They are responsive to and may be operated by thermostats, pressure switches, float switches, timers, or remote electrical switches.

Mechanical features include screwed, flange, or solder types—for standard or special voltages—manual opening stems—3/8" to 2" connections—designed for pressures up to 200 lbs.—approved by Underwriters' Laboratories.

Due to mandatory Wartime restrictions, Alco Solenoid Valves are available with high preference ratings only. Alco Valve Company, for many years the leader in the field of refrigerant controls, invites you to send your control problems to our research laboratories. Write for free Bulletins No.'s 173-174 on Solenoid Valves, or No. 17C for information on our complete line of Refrigerant Controls.

TYPE S1

TYPE S2

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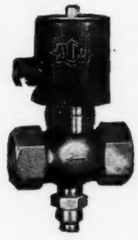
TYPE M3



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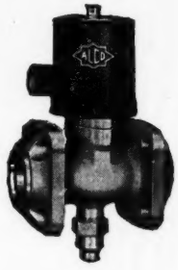

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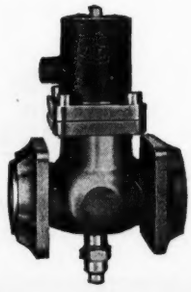
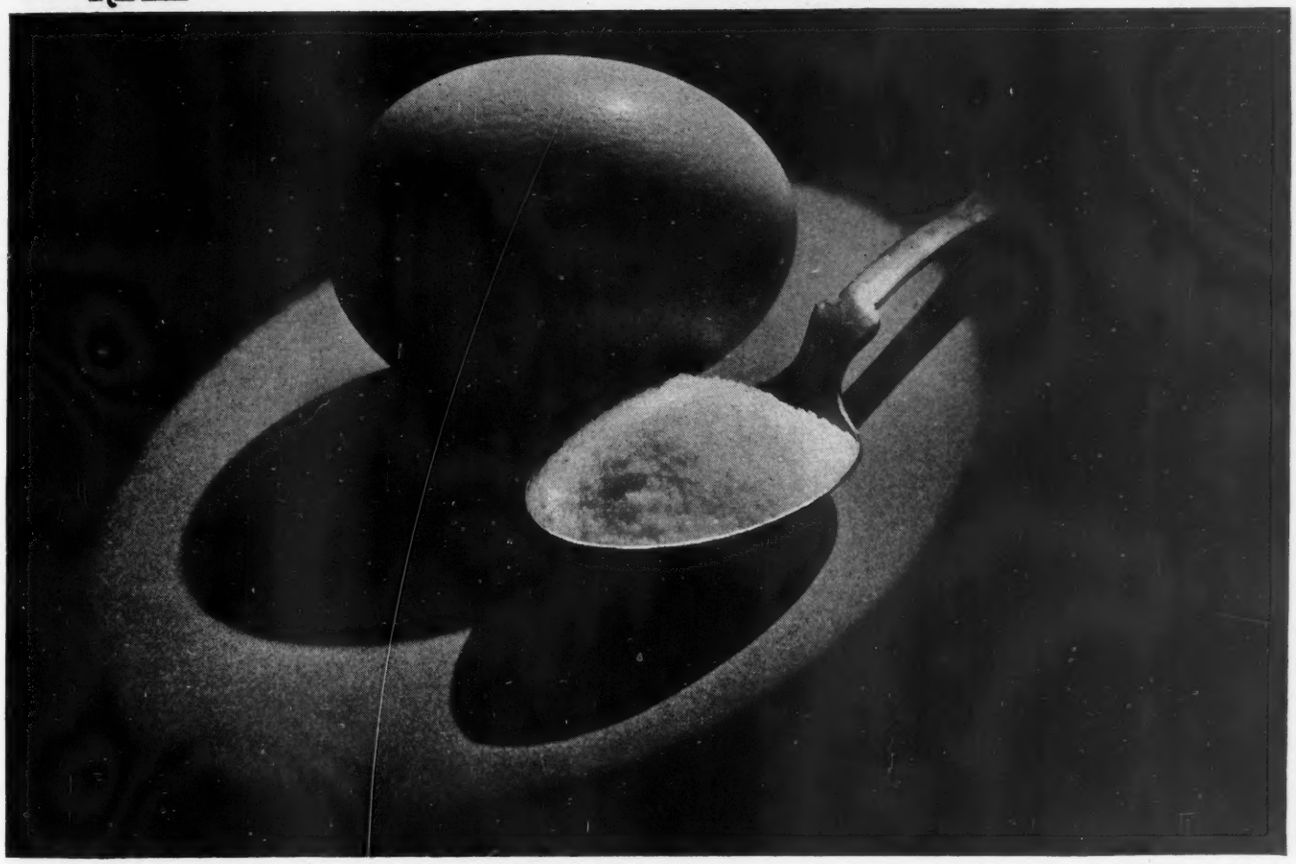


TYPES R6 and R2

ALCO VALVE COMPANY • 2642 Big Bend Blvd., St. Louis, Missouri

The Modern Humpty Dumpty



Make Buell Powder Collectors Part of Your Spray Dehydration System

The modern Humpty Dumpty is a spoonful of yellow powder less than one-fourth as big as he'd be in the shell—but that's just what makes him so important!

Whether you are dehydrating eggs or milk or citrus juices or soup mix, your spray drying hook-up ought to include Buell Powder Collectors to recover material that would otherwise be lost in the exhaust gases. Since these powder losses frequently run high, a Buell system will quickly pay for itself in material saved.

Buell Powder Collectors specially designed for food processing are made of special metals to meet all Pure Food requirements. Corners are rounded to prevent lodgement of material, and an ingenious hinged construction facilitates take-down for easy cleaning.

The high efficiency of Buell collectors is due to the patented van Tongeren cyclone—an exclusive Buell feature. Buell Powder Collectors have no moving parts, require little or no attention, will not clog, and cost little to operate.

Write for factual 28-page book "Bulletin FI-1"

BUELL ENGINEERING COMPANY, INC.
70 Pine Street, New York
Sales Representatives in Principal Cities

BUY WAR BONDS AND MAKE THE AXIS BITE THE DUST

CONSULT BUELL *First* IN DUST RECOVERY
for Chemical • Rock Product • Metallic • Food • Flue or any other dusts

buell
DUST RECOVERY SYSTEMS

Their container needs come FIRST

DOWN COME the paratroops, especially armed, clothed, and provided with food to help them carry out their task.

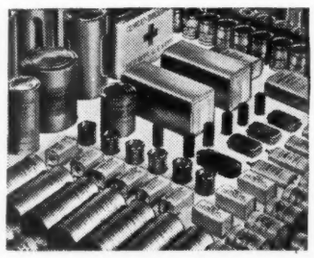
Their food is carried in metal containers. It is sufficient for three meals. It is known in the U. S. Army as the "K" or "parachute ration."

Huge quantities of metal containers for ration "K" are needed by our armed forces. Tremendous quantities of other metal containers are being demanded by the Army and Navy —by Lend-Lease Authorities, and by civilians behind the lines.

In addition to helping maintain vital food supplies, metal cans have also been selected as the ideal containers for many direct war items. They carry blood plasma transfusion kits . . . bandages . . . explosives . . . oil, and many other war essentials.

American Can Company machine shops are also making specified tools and war munitions.

So when the question arises concerning the lack of metal cans, it should be remembered that with Canco—as with every other manufacturer—the fighting forces come first.



Farseeing government planning is doing a splendid job in conserving our national tin supply and helping to solve the metal container problem. American Can Company was among the first to take an active part in this conservation program. And, we are grateful to all those manufacturers who have cooperated with us, and with the war effort, by accepting substitute containers for the duration.

★ ★ ★

Canco fully appreciates the problems facing your industry today. This company is constantly endeavoring to produce suitable containers from the materials now available; in fact, some such containers are already in use. Indeed, a large part of our research and experimental efforts are being devoted to this vital task. *American Can Company, 230 Park Avenue, New York City.*

Power—Giant Arm of Production

Ninety Per Cent of American Industry Is Electrified

ELECTRICITY is the mainspring that turns the wheels of our factories, mills and mines. It is the tireless arm that grinds our grain, weaves our cloth, pumps our water, builds our planes, our guns, our ships, our cars, our trucks and tanks . . .

The mighty Pharaohs had less energy at their disposal in building their pyramids than is generated today by one single power plant. The combined capacity of America's central power systems is without parallel in the history of the world . . . 46 million kilowatts, i.e., 65 million horsepower in steam turbines, hydro turbines and other prime movers. That is more power, day in and day out, than 650 million slaves could produce—for a limited time—minutes in fact.

The capacity of this vast fountain of energy is beyond the grasp of the average man who flips a switch and sets in motion machines that perform the labor of a thousand man-hours in a matter of minutes. Perhaps only the old time farmer, whose traditional source of power is a team of tired horses and a pair of calloused hands, knows how to appreciate this commodity that is so vital an ingredient of everything we consume and use.

Yes, we take electricity for granted. We expect it to appear in unlimited quantities, like water and air, as we need it. Almost as essential as these two elements in times of peace, it becomes a matter of life and death in times of war. Industry would collapse without it and the nation would quickly perish.

With the catastrophe of Pearl Harbor a little over a year ago, came the realization that we had to out-produce our enemies. To out-produce our enemies, who had a seven year head start, meant to turn more wheels than they were turning and to turn them faster than they were turning them.

New plants sprung up overnight. Production increased beyond our wildest dreams. Aircraft and shipbuilding surpassed the most daring forecasts. The machine tool industry's output grew to a volume that bordered on the miraculous. Guns, shells, uniforms, shoes, tanks and a thousand other items were being made in hitherto undreamed of quantities. All of them have one common essential ingredient – power. Industry demanded power – more and more power!

It is no small tribute to the power industry that, while other raw materials developed shortages necessitating strict priorities control, electricity remains unrationed – no priorities, no curtailments, no rate increase. Current industrial consumption is running 16 per cent over 1941 and 50 per cent over 1940. Not spectacular perhaps but when we consider that the nation's 26 million domestic consumers utilize only about 14 per cent of the energy output, we begin to get some idea of industry's power consumption.

Our power companies might have been stunned by the prospect of mounting demands for kilowatts. Instead they set about developing and coordinating a multiplicity of relatively small and seemingly unrelated factors. Individually or even collectively, these have not been of a spectacular nature. Certainly they have not inspired the award of the Army-Navy E although they are an essential ingredient in every Army-Navy E that has been awarded to American industry.

The contribution of the power industry to the winning of the war is not likely to flame forth in newspaper headlines. It takes the more prosaic turn of portraying an industry that is doing wonders quietly, unobtrusively.

At the close of the last war the power at the disposal of the American industrial worker averaged 3⅓ horsepower. At the beginning of this war, twenty years later,

This is the seventh of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers, and in daily newspapers in New York, Chicago and Washington, D. C. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.

it had increased to 6½ horsepower. What other nation can even approach that figure? This large provision of power is the achievement of the electric utility industry. For years it had built and applied its equipment to the highest standards of performance and operated its systems to equally high standards of service and dependability. Always recognizing that "public service is a public trust" it had maintained wide margins of security in performance. Today these margins are the source of the power industry's ability to rise to the emergency.

In short, the electric utilities were prepared!

Power men are accustomed to looking ahead, to prepare for growing loads and allow for unforeseen contingencies, for electricity cannot be stored. It is "ordered" by touching a switch. It is delivered and consumed at the same moment.

Months before the actual outbreak of hostilities foresighted power men set to work computing how much life of equipment could be risked in the process of crowding it toward greater output. Generators, boilers, turbines, cables, transformers and even conductors underwent close scrutiny in an effort to increase the load – *safely*. They figured, they experimented, they tried untried measures.

Insulation, for example, is the crux – the least known component of electrical apparatus. When it lets go the service suffers. It is not easy to know how near any bit of crucial insulation is to letting go. It takes courage to work it to a point just short of failure . . . but that is exactly what is being done today.

Technological forcing of equipment, however, is not all of the story. Obsolescent equipment has been rehabilitated; salvage has been intensified; critical metals have been replaced by non-critical materials; water sprays, air-blowers and other cooling methods have been installed to keep over-loaded apparatus from over-heating. Nothing has been overlooked. Ingenuity has contrived the well nigh impossible.

Hand in hand with these measures of expediency have gone measures of intensification. Hydrogen pressure for cooling generators has been stepped up from ounces to pounds taking more heat away from the machines and enabling them to carry greater loads. Capacitors – little more than aluminum foil interleaved with thin paper – have been applied by the carload relieving the systems of that mysterious reactive current which is associated with that equally mysterious power factor. They have performed wonders in avoiding the need for additional generating and transforming equipment. The use of portable sub-stations has averted the otherwise necessary reserve capacity in fixed installations at many points.

When coal was placed on the urgent list last spring the electric utilities outstripped all other industries in providing storage for the winter. Stocks on hand the first of October were sufficient for 105 days, or more than twice what would be considered adequate in times of peace.

When staff losses to the armed forces became serious power companies contrived measures that enable them to get along without aggravating the national manpower situation by hiring others to replace them. Today meters are being read every two or three months instead of monthly; women are being trained to do drafting, keep the logs in power plants and sub-stations and to test meters in shops and laboratories.

On the summit of "Grandpa's Knob", a mountain overlooking Rutland, Vermont, stands a giant windmill that would have been the delight of Don Quixote. Towering 200 feet above the tree tops its mighty 175 foot propeller turns with the wind and drives a 1,000 kilowatt generator which feeds its output into the Central Vermont Public Service Corporation's power system. The most ambitious wind-turbine generator in the world, and a daring experiment of forward-looking men.

Today everything electrical is being tried; is being worked harder than it has ever been worked before.

Great credit is due the men behind the electric power industry. These men have recognized the responsibility of their jobs – it is a part of their very being. Theirs is the kind of service that *must* be maintained. No soldier is truer to his trust than is the employee of this great industry.

The service must go on! No matter what happens – acts of God or deeds of men – the service must go on! Labor disturbances may disrupt other industries but there have been no shutdowns due to labor trouble in electric power plants since Pearl Harbor.

And this winter when blizzards pile up drifts and sleet makes pavements slippery there may be absenteeism from other plants but the utility employees will be on the job ready to climb the ice-covered poles and repair the ice-laden lines whenever the call comes.

In this war the least costly yet the most precious element of production – electricity – will be ever ready to "man" the machines that will produce the weapons that will give victory to the forces of freedom.

President, McGraw-Hill Publishing Company, Inc.

FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor JANUARY, 1943

A Food Administrator . . . Now We're Getting Somewhere

AT last we have a Food Administration, and not one moment too soon. Despite the glaring omissions from the President's Executive Order No. 9280 creating the Food Administration (printed elsewhere in this issue) there is enough leeway in the various features of the order to permit the Administrator to accomplish all the things we can foresee at this time that need to be done.

The order itself omits all reference to processing, and every food processor in the nation has felt that, lacking such specific authorization, the food processors were to be further treated as if they were unpleasant stepchildren. Only by implication is it discernible that the Food Administrator is empowered to provide the food processors with such facilities—added or altered—as are needed to process and thereby preserve the greatly increased volume of raw foods the farmers must and will produce.

Wickard Aware of Problems

It is gratifying to be able to present in this issue a statement from Food Administrator Wickard which indicates his awareness of the job ahead of him, and of his intention to lend comprehensive treatment to the problems of food processing, at least insofar as the initial organization setup is concerned.

Mr. Wickard deserves our support, and this publication will do all it can to insure the proper execution of his responsibilities and the attainment of the objectives specified in the executive order. To say this does not, however, mean that FOOD INDUSTRIES shall become a "yes man." Heaven forbid that we ever lose our ability to criticize! But in the exercise of that power we hope that it will always be constructive. It is always better to point out the way to more satisfactory accomplishment than merely to crab. FOOD INDUSTRIES' 14-month campaign for unified treatment of the vital food problem is merely a start.

The success of the Food Administration will depend on several factors, not the least of which will be weather in the crop-growing season and the men whom the Food Administrator appoints to help carry out this gigantic assignment.

That Mr. Wickard realizes the need to push ahead on three fronts—production, processing and distribution—shows a hitherto unsuspected breadth of view in the Secretary of Agriculture.

If the man selected to succeed Leon Henderson as head of OPA, and if Donald M. Nelson, head of WPB, also learn the need for the processing function in our national and Lease-Lend food supply, then the entire nation, as well as the food industry, can face the future with confidence and the assurance that they will not be expected "to make bricks without straw."

Future Will Not Be Easy

Troublous days are still ahead. Let no one think that the future will be easy. The principal gain from the existence of a Food Administration will be that at last there is an agency in Washington that is empowered and directed to insure the proper operation of food production-processing-distribution within the limits of our national resources. Heretofore, it has been left entirely to unrelated agencies.

At last we are getting somewhere.

L. V. Burton EDITOR

The Talk of the Industry

• A BREWERY in Philadelphia has been closed for four months, according to WPB, because the folks exceeded their allotment of crowns.

• ALTHOUGH it's a little outside the food field, the news that the U. S. Army has been buying ladies' unmentionables for distribution in North Africa has its points.

• OUR old friend Rexford Guy Tugwell, now governor of Puerto Rico, appears in the news again. He is again blamed for food shortages on the island. Makes friends wherever he goes, doesn't he?

• Now that heavy or whipping cream is off the market by WPB order, there is a good chance for some smart folks to sell a solution of calcium sucrate to housewives who can't run their affairs

without whipped cream. Two or three drops will make a cupful of light (19 percent) cream whip splendidly. But don't write to us about how to make calcium sucrate. If you don't know how to locate the information in books on organic chemistry, better leave it alone.

• CREDIT Lewis W. Waters, vice-president, General Foods Corp., with the best wisecrack of the month. Some one, deprecating the postwar outlook for dehydrated foods, remarked to him: "After the war all this boom in compressed dehydrated foods will collapse."

To which Mr. Waters replied: "Well, if it doesn't, we shall probably see a lot of micro-stores in the land."

• ADS by Charles B. Knox Gelatine Co. urge the consumer to stretch one pound of butter into two pounds by whipping into it gelatine, evaporated milk, water and salt. Knox's way to meet the butter rationing problem has been expected to start some acrimonious criticisms from the stout-hearted defenders of the sanctity of the cow, but the criticisms have not yet materialized. Maybe it's the evaporated milk, or is it possible that the Knox variety of gelatine is made solely from calf-skin trimmings?

• THE President's prediction of 9,700,000 men in arms by January 1, 1944, should be coupled with a hint dropped by Col. Paul P. Logan at the GMA convention. Colonel Logan indicated that the Army would take additional food company employees in 1943. Now we shall see what Paul V. McNutt does about it.

• PEOPLE are funny. Recently a chain store put up a sign limiting all customers to 2 lb. of flour, a commodit which was then available in unlimited amounts. This limitation started a run that cleaned out not only all the flour in the store but nearly all the flour in the town.

It recalls an incident in the 1922 depression when a large canner had about 40,000 cases of spinach that could not be sold at any price. Finally the sales manager withdrew the large amount and offered only 100 cases, which was sold, well over a dozen times, during the first week. Same principle. Yep. People are funny.

• WHO would ever think that with a two-year supply of wheat in the United States there could be a flour shortage? It's just one more manifestation of the mess in the food situation that the Food Administrator must clean up, if he can.

Most of the wheat is in the control of Commodity Credit Corp. but may not be sold below parity—Congress has ordered it so. So millers must buy wheat in the open market, but OPA ceilings on flour and CCC policy on wheat have created a situation where flour from open market wheat could be sold only at a loss in mid-December. And many millers prudently withdrew from the market.

Great stuff, this managed economy.

• HEAVY underwear this winter is advised by Prof. C. E. A. Winslow, of Yale University, as the best way to keep warm where fuel is too scarce to maintain normal indoor temperatures. In short, we are to wear "woolies" as they do in Britain.

Unfortunately, however, most city dwellers donated their "woolies" and "heavies" to Bundles for Britain in 1941, and new ones are likely to be in unsatisfied demand. Looks as if some of us will be going to bed much earlier than usual these winter nights.

• BOCK beer is officially a war casualty on account of the trucking situation, according to an announcement by Brewers Board of Trade. It may be that bock is out for the duration, but the explanation is not very smart. If trucks should not be used to haul bock—well, figure it out yourself.

• INCIDENTAL intelligence: Dog population in the United States is 15,300,000, according to estimates prepared by WPB to decide what to do about the dog food business.

• TIMES surely have changed! Once the man with a new food to offer to the trade had to resort to the most skillful methods to interest large distributors in the new product. Today, however, even the biggest chain stores will try anything—just to have something to put on their shelves.

Opportunities like this must be handled and exploited with exceeding care. If your new food does not taste good, does not merit repeat purchases by consumers because they like it, you can bet your bottom dollar it will be kicked out at the first return to normal conditions.

Packaging in Reverse

The mystery of the moldy sausage has been solved. But it took another mystery to find out about the first one.

When a lady purchased a flat box of breakfast sausage she was much annoyed that the clerk tore the lid off the box.

"Wot's the big idear?" sez she, being an Easterner.

"Well, lady, it's this way. People buy this here sausage, which is all OK, as you can see. Then they put them in their refrigerators at home an' pile a lot of junk on top of them. Then they forget 'em for a couple a' weeks until they grow a set of whiskers. 'N then they bring 'em back an' tell us they're spoiled an' want their money back.

"So we jus' tear the lid off now, so's they don't forget they got some good sausage in the ice box. It works fine. Anything else, lady?"

Huge Expansion Ahead in Vegetable Dehydration

The vegetable dehydration industry is expected to perform a feat roughly equivalent to the recent expansion of aircraft production. Production in 1942 was a little short of 100,000,000 lb. This is but a modest start compared to the 1943 schedule of more than 400,000,000 lb., dry basis.

This expansion is a 400 percent increase. According to R. Harry Amenta of WPB in an address before Grocery Manufacturers of America, the amount of unprocessed vegetables to be dehydrated in 1943 will be approximately equivalent to the total amount canned in 1942.

With the facilities available it looks like a difficult assignment, but this is a day when we are doing the impossible.

Can the food industry meet the challenge?

Can we equal the record of aviation industries or "that man Kaiser?"

This food will be just as important as munitions, for every bit of it is destined for overseas use by our allies, the armed forces of the United Nations and the people we succeed in liberating from the Axis. None of it is yet scheduled for civilian use in this country.

The ability of food technologists to adapt themselves to new processes and to improvise much of the needed equipment will be put to a severe test.

We must not fail.

Government to Take Over All Research?

Many food technologists have been wondering what has become of the proposed OTD (Office of Technical Development) in WPB which was being actively promoted last July by Maury Maverick, one time mayor of San Antonio. Several technical groups, including food technologists, were called to Washington July, 1942, to examine the need for a central research organization to promote, collate, integrate, survey and finance research in their respective fields, to suggest typical problems needing study, to estimate roughly the size of the appropriations needed and to indicate the benefits to be derived from such a function.

In general the tentative idea was the creation of a civilian equivalent of OSRD (Office of Scientific Research and Development) under Dr. Vannevar Bush which handles research problems of the armed forces. For the civilian economy, there was then no equivalent organization. Thus, though the civilian economy involves 20 times as many persons as the military forces, its wartime problems were not the subject of any integrated study or guidance.

The report of the food group was acknowledged, but nothing else ever happened that could be learned outside of WPB. Apparently the whole idea of OTD died aborning. Anyway it was never given a decent official burial.

The wartime problems of the civilian economy remained, however, and unified direction of their solution to avoid duplication and omission continued to be a crying need.

A Substitute

Next came the creation of an effective substitute, OPRD (Office of Production Research and Development) by order of Donald M. Nelson of WPB, with appointment of Dr. Harvey N. Davis as its director on Novem-

Hors d'Oeuvres

• The Tokyo radio has protested that American submarines attack fishing boats off the coast of Japan "as if they were shooting wild ducks." A mistake on our part. Should do it as if we were shooting skunks.

• *A study has been made of the nutritional inadequacy of beet molasses rations for swine. A good thing to know when we start feeding occupied Germany.*

• Can makers have turned out millions of steel containers to hold water for soldiers on the march. So we build dehydration plants to take the water out of food so we can take the food out of cans so we can put water into the cans we took the food out of that we took the water out of.

• *Some 30 percent of all families in the United States are dependent upon food for their income. And 100 percent are dependent upon their income for food.*

• A psychiatrist has urged troops to drink, but in moderation. On a private's pay what else could they drink in?

• *Latest among the war babies of the food industry is a "coffee stretcher" consisting of a "wholesome" mixture of barley, peas, cocoa shells and chicory. Used half and half with coffee, it is reputed to be a good drinkable beverage. Maybe so, but so is raspberry juice.*

• When foods are preserved in salt or sugar brine, osmosis withdraws water from the protoplasm of the spoilage organisms, shriveling and inactivating the cells. Which is the same effect as dehydration. It's a small technological world, isn't it?

• *Some strains of staphylococci bacteria elaborate a toxin from food which produces an intoxication. Ever been staphylococciated?*

• It is believed by some that the world as a whole will be better fed as a result of this war.—Perhaps, what there is left of it.

• *Food tasters have formed a new association called the Gag and Vomit Club. Probably more truth than poetry.*

• In Chicago a food distributor is using horses as transportation for salesmen. In Boston a food distributor is selling horse meat. Sort of burning the saddle at both ends.

• *Special Bull-etin—Carnation Ormsby Madcap Fayne gave birth to a black and white Holstein bull calf at the famous Carnation experimental farm near Seattle, Wash., on December 7.—Apparently one experiment worked.*

• It is said that there are discriminatory taxes on margarine in 29 states which will limit that commodity's ability to relieve the butter shortage. Could it be that the lobbyists don't know there's a war on?

• *Without the blessing of Jap labor, the British Columbian salmon canneries produced a record pack of sockeye salmon. And the thought has been expressed that "our fisheries are indeed well rid of the Japanese."—Yes, indeed.*

• German Alcohol Consumption Up, says a headline. We ought to send them some of our prohibition bootleggers. Blind people can't fight. F.K.L.

ber 9, 1942. Under the four principal functions outlined by Mr. Nelson it appears to be possible to carry out many of the recommendations of the food group except that of creating a sort of technical service organization capable of carrying the results of research to such food manufacturers as might be unable to comprehend a research report and to help them to translate new research into action.

Knowing and admiring Dr. Davis, we wish him all success in the new work and withhold further comment until his new setup gets going.

Watch Congress

But the wartime story of technological development must now be followed in Congress where as strange a proposal as the "Tugwell" Bill—old S. 1944—has appeared in the form of two identical bills, S. 2721 and H. R. 7591, "to establish an office of technological mobilization." The Senate bill was introduced by Senator Harley M. Kilgore, West Virginia, chairman of the Subcommittee of the Committee on Military Affairs. Hearings began on October 13, 1942. This bill, if enacted in its original form, would grant dictatorial power over all research, research workers, laboratories, factories and patents. The OTM could go into any plant and initiate changes and reforms that might seem desirable. OTM could "draft all such personnel and facilities failing to submit or to accept plans for immediate conversion of their efforts to work deemed more essential by the Office of Technological Mobilization." The bill also would create a Technological Mobilization Corp. with capital of $200,000,000, to be headed by a $12,000 man who would also be director of technological mobilization. The purpose of the corporation would be to finance such research as was farmed out.

In its original draft the bill would take in everything, including OSRD and OPRD, also the Regional Research Laboratories (OSRD now has a $77,000,000 budget and has been going strong since June 28, 1941, when it was created by Executive Order No. 8807), all university laboratories and all industrial research laboratories. Its failure even to recognize the existence of the vitally important OSRD is suggestive of some uninformed do-gooders in the background. The bill itself has a desirable purpose but its methods are totalitarian. It fails to realize that research is a function of the mind, not of the body. You can draft men—their bodies—but you can't get brains to work creatively in that manner.

While it seems unlikely that the bill will ever pass, it is interesting to note that Donald M. Nelson has appeared before the committee in a noticeably lukewarm approval of its principle, but suggesting that he would rather see the capital stock of the Technological Mobilization Corp. raised from $200,000,000 to $500,000,000.

Shades of the Regional Research Laboratories! How some of us shuddered over the then fantastic-sounding appropriations that created them, and shook our heads in grave doubts about the wisdom of a few millions spent with profligate abandon to conduct research.

S. 2721 is worth watching.

What Hoover Really Said

Too bad that Herbert Hoover felt he had to be so diplomatic in his December 3 speech before the National Association of Manufacturers. Two of his points that deserve nation-wide attention are buried—the sort of thing that you have to read between the lines. These are his sixth and eleventh conclusions.

In plain, ordinary, undiplomatic English the sixth says: There are not men enough in the country to do all the jobs we have promised to do. We have bitten off more than we can chew. The eleventh conclusion says that production is far more important than price ceilings.

To which conclusions, all in the food industry will utter a fervent "Amen!" Between scarcity of help and price squeezes the problem of food production is increasingly difficult.

Edible Wetting Agents Needed

To facilitate the rapid rehydration of dehydrated foods something is needed to speed up the absorption of water. This was the joint opinion of a recent informal gab fest of several food technologists in a hotel bedroom. So that many minds may get to work, the problem is laid before the entire food processing industry.

Such a needed wetting agent should, of course, be edible—absolutely harmless. Furthermore, it should preferably be tasteless, or else have a mild, pleasing flavor. It must be a solid, stable in character, nonvolatile and preferably colorless, though certain hues might not be objectionable.

If you have any ideas please send them to the editor of FOOD INDUSTRIES.

Compliments

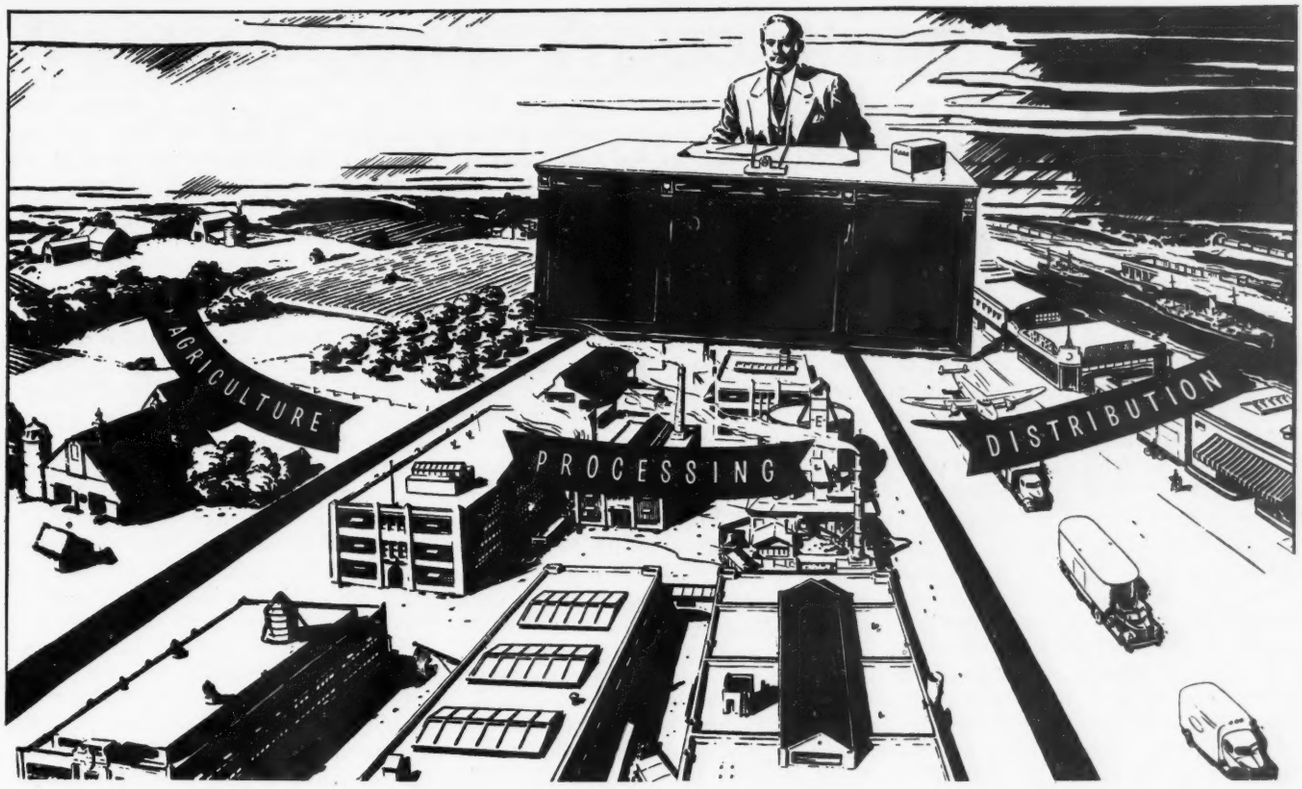
L. Charles Mazzola merits our compliments for his generous attitude in allowing the food processing industry to obtain licenses to use his discovery of a satisfactory method of lye peeling of vegetables for a nominal sum during the war emergency. (See page 53.) The method will save a large quantity of food, and reduce operating costs.

He is the same Charles Mazzola many of you have known as secretary and production manager of Ivanhoe Foods, Inc. At the present he is in the Quartermaster General's Office, Subsistence Branch, where he will be in charge of renegotiation of subsistence contracts.

Chemical Preservation

It is FOOD INDUSTRIES' conviction that the time is coming when every available trick and device must be used to preserve our perishable foods, including the use of so-called chemical preservation, but when we say this we are not going off the deep end, nor are we advocating a departure from common sense. Seizing on this preservation idea, some one, with what seems to be more zeal than judgment, has proposed thymol or its sodium derivative as a food preservative—to which we take violent objection on several grounds, even for an academic discussion. Its flavor and odor are unpleasant, even if it were admissible on all other grounds—which it is not.

If a suitable preservative is ever developed, it must be efficacious in very low concentrations, such as 0.01 percent. It must be odorless, tasteless, nontoxic in reasonable amounts [remember even salt (NaCl) will kill], and its pharmacology and effect on nutrition must be known to be innocuous. And then there is the little matter of food regulations to be considered. If such a chemical paragon of technological excellence is ever developed, we believe there will be a use for it during the emergency.



This shows the place of the Food Administrator in the overall food picture of the nation. He will coordinate the three basic phases of the country's huge food industry—agriculture (or production), processing and distribution.

A TIME FOR TEAMWORK

By CLAUDE R. WICKARD, Secretary of Agriculture.

Food is going to have a lot to do with how soon the United Nations win this war and with how well they write the peace. The United States has the responsibility of supplying a large part of that food

WHEN you look at the food job this nation is up against, two facts stand out. First, it is a huge job. Second, it is all one job, not a group of separate problems.

As to the size of the task, consider that already we have 6 million men under arms, and our Army and Navy still are growing. Fighting men need plenty of good food—our soldiers eat about a quarter more than they did in civilian life. Offensives, and overseas actions, generally, call for large reserves of food. Our people here at home need plenty of good food—they are working harder and longer than they ever have before. Many of our allies need food from us so that they can keep up the fight. Britain and Russia need especially large quantities, both for their fighting men and their civilian war workers. Military and Lend-Lease needs alone will take about a quarter of our entire production in 1943.

Over and above those current needs we must build larger food reserves. We need to protect our own people and our soldiers and allies against any unlooked-for emergencies. We also must be ready to do our share toward feeding the starving people of the occupied nations as soon as the Axis invaders have been driven out. There is nothing of the starry-eyed about relief feeding during and after the war. That work will be just as practical as it is humanitarian. As each nation is freed, food from the United Nations will make the people stronger to join us in the fight against the Axis. If we are unable to feed the people who are liberated, many of them will wonder whether they were better off conquered and half starved, or freed and wholly starved. The whole social structure of those hungry areas might well collapse.

All of these wartime requirements spell a record demand for food from the United States. The only way by which we can hope to keep meeting the requirements for our food is to treat the problem of food supply as a single problem and to concentrate all our energies and materials on turning out essentials.

A Three-Phase Problem

Although the process of making food available to people who need it falls naturally into the three great steps of farm production, processing and distribution, it is not possible to consider any of the three steps separately. In the larger sense food is not really produced until it is in shape to be eaten and is set before the person who is going to eat it. A hog on the hoof isn't food. Neither is a carcass in the chilling room. Supplies on an East Coast dockside aren't effective food for troops in North Africa.

Every phase of the long process of meeting requirements for food is a link in a chain that must not be broken. If farm production falls short, the best processing resources in the world can't make up for the shortage. If farmers turn out bumper crops, part of their effort will be wasted unless processors are able to handle all of the raw products. If distribution should break down, the efforts of both farmers and processors would be lost.

Somewhere along its length, the chain touches nearly every segment of our economy. Farm production will be affected by the amounts of manpower and materials that can be made available. The same things are true of processing capacity. With less emphasis on materials, they are true of distribution, too. In wartime our national supplies of manpower and of many critical materials are scarce. In managing our food supply it is necessary to have the whole picture in view. It is necessary to know how much of what kinds of food will be needed—to know when and where they will be needed. Then it is necessary to see that enough of our national resources are made available to turn out the essential supplies of food, and that these resources are used where they will do the most good.

Recently the President centralized in the Department of Agriculture the responsibility for managing our food supply in wartime. I believe that his action to bring all parts of the problem together in one place is a farsighted move that will help bring victory sooner. As Secretary of Agriculture I am deeply conscious of the responsibility the President has placed upon me. As I view the task it is not one that can be carried out by any one man or group of men—it is one that calls for the united effort of the whole nation.

Administrator's Functions

The main function of the Federal government will be to give direction to the entire effort—to measure the total war demand for each important food and to assist farmers, processors and distributors in turning out the required amounts. That will include steps to make manpower available, allocations of scarce materials, actions in regard to credit, prices and margins, and in some instances allocation of food itself from the time it leaves the hands of processors. In cases where supplies for civilians in this country are appreciably below the demand, rationing will be necessary. Carrying out those steps will require patience and mutual understanding. Recent events have shown that the government and the food industry can work together most successfully. This year's great record would not have been possible without such cooperation.

Farmers in 1942 smashed all previous production records, and made their greatest gains in the food products which are needed most in fighting this war. Last month I met with farmers and farm leaders at a series of regional conferences on the 1943 farm production goals. Those goals are high. They will be harder to achieve than last year's, but the farmers of every area are determined to reach them. I believe that the nation can rely on their reaching them, barring widespread drought or some other unpreventable calamity.

Food Industry Efficient

American processors and distributors of food are, like American farmers, wonderfully efficient. This is not the time to change basic methods and relationships in either food processing or distributing, just for the sake of change. Distributors and processors did a magnificient job last year. They have the skill and the organization and the spirit to handle the larger job ahead. We in government are relying upon their advice and cooperation. On the other hand, there must be no holding back from any new steps which may be needed to get the food job done. For instance, there is no room for delays in allocations or rationing once it becomes clear that those steps are needed for any food. The government has the responsibility of keeping abreast of the situation and of acting quickly. On the other hand, the government has an equal responsibility for steering away from unnecessary changes in the way processors and distributors do business, and for extending them all possible help in making the adjustments which are needed.

In addition to the cooperation of the government, farmers, processors and distributors, the cooperation of a fourth group is required—civilian consumers, particularly the housewives of the nation. Although the total amount of food for civilians will be enough to afford good diets, supplies of some foods that are particularly needed by our troops and allies will be shorter than in the past. Other foods will reach grocery shelves in new and unfamiliar forms. Consumers will have to make many adjustments to the new conditions. I am convinced they will do this gladly, provided they know exactly why the adjustments are necessary. It is the responsibility of the government to keep consumers, as well as farmers, processors and distributors, informed on the food situation and to make clear the reasons for taking each action.

As head of the wartime program for food, I shall work closely with the farmers, processors, distributors and consumers and consult with them in regard to shaping and carrying out the various parts of our food program. Fortunately, the Department of Agriculture already is well equipped to handle its broadened responsibilities. In addition to its long history of work in connec-

(*Turn to page 79*)

Press Association

Food Administrator Wickard (right) confers with his chief assistants, Roy F. Hendrickson (left) and Herbert W. Parisius. Mr. Hendrickson is director of the Food Distribution Administration and Mr. Parisius is director of the Food Production Administration.

Text of Order Appointing Wickard Food Administrator

This executive order, issued by the President on December 5, 1942, forms the basis for the future activities of the Food Administrator. Which makes it of prime importance to the food industries. Management should be familiar with its provisions

BY virtue of the authority vested in me by the Constitution and the statutes of the United States, as President of the United States and Commander in Chief of the Army and Navy, and in order to assure an adequate and efficient distribution of food to meet war and essential civilian needs, it is hereby ordered as follows (Executive Order 9280):

1. The Secretary of Agriculture (hereinafter referred to as the "Secretary") is authorized and directed to assume full responsibility for and control over the Nation's food program. In exercising such authority, he shall:

a. Ascertain and determine the direct and indirect military, other governmental, civilian, and foreign requirements for food, both for human and animal consumption and for industrial uses.

b. Formulate and carry out a program designed to furnish a supply of food adequate to meet such requirements, including the allocation of the agricultural productive resources of the Nation for this purpose.

c. Assign food priorities and make allocations of food for human and animal consumption to governmental agencies and for private account, for direct and indirect military, other governmental, civilian, and foreign needs.

d. Take all appropriate steps to insure the efficient and proper distribution of the available supply of food.

e. Purchase and procure food for such Federal agencies, and to such extent, as he shall determine necessary or desirable, and promulgate policies to govern the purchase and procurement of food by all other Federal agencies: *Provided*, That nothing in this subsection shall limit the authority of the armed forces to purchase or procure food outside the United States or in any theater of war as such purchase and procurement shall be required by military or naval operations, or the authority of any other authorized agency to purchase or procure food outside the United States for rehabilitation or relief purposes abroad. Existing methods for the purchase and procurement of food by other Federal agencies shall continue until otherwise determined by the Secretary pursuant to this Executive Order.

Materials and Equipment

2. The Secretary shall recommend to the Chairman of the War Production Board the amounts and types of non-food materials, supplies, and equipment necessary for carrying out the food program. Following consideration of these recommendations, the Chairman of the War Production Board shall allocate stated amounts of non-food materials, supplies, and equipment to the Secretary for carrying out the food program; and the War Production Board, through its priorities and allocation powers, shall direct the use of such materials, supplies, and equipment for such specific purposes as the Secretary may determine.

3. Whenever the available supply of any food is insufficient to meet both food and industrial needs, the Chairman of the War Production Board and the Secretary shall jointly determine the division to be made of the available supply of such food. In the event of any difference of view between the Chairman of the War Production Board and the Secretary, such difference shall be submitted for final determination to the President or to such agent or agency as the President may designate.

Civilian Rationing

4. The Secretary, after determining the need and the amount of food available for civilian rationing shall, through the Office of Price Administration, exercise the priorities and allocation powers conferred upon him by this Executive Order for civilian rationing, with respect to (a) the sale, transfer, or other disposition of food by any person who sells at retail to any person, and (b) the sale, transfer, or other disposition of food by any person to an ultimate consumer, as is currently provided for in War Production Board Directive No. 1, dated January 24, 1942, and existing supplements thereto; and with respect to (c) the sale, transfer, or other disposition of food by any person at such other levels of distribution as he may determine; and in the administration or enforcement of any such priorities or allocation authority for civilian rationing, the Office of Price Administration, subject to the provisions of this Executive Order, is hereby authorized to exercise all the functions, duties, powers, authority, or discretion conferred upon the Price Administrator by Section 3 of Executive Order 9125 of April 7, 1942. The Secretary, before determining the time, extent, and other conditions of civilian rationing, shall consult with the Price Administrator.

5. In discharging his responsibility under this Executive Order with respect to the exportation of food, the Secretary shall collaborate with the other agencies concerned with the foreign aspects of the food program in the determination of plans, policies and procedures for the feeding of the peoples in foreign countries and the production and stockpiling of food for use abroad. With respect to the issuance of the directives for the importation of food heretofore issued to the Board of Economic Warfare by the Chairman of the War Production Board under Executive Order No. 9128 of April 13, 1942, the Secretary shall issue those directives which relate to the importation of food for human and animal consumption, and the Chairman of the War Production Board and the Secretary shall jointly issue those directives which relate to the importation of food for industrial uses. The Chairman of the War Production Board shall continue to issue all other directives which relate to the importation of materials, supplies, and equipment required for the war production program and the civilian economy. Schedules of priorities heretofore prepared and issued by the Chairman of the War Production Board under Executive Order 9054 of February 7, 1942, for the importation by overseas transportation of food for human or animal consumption and for industrial uses shall be similarly issued, and transmitted to the Administrator of War Shipping Administration for his guidance.

6. In discharging his responsibility under this Executive Order, the Secretary shall, in the event of a shortage of domestic transportation service, and after consultation with the War Production Board for the purpose of adjusting the relative demands for the movement of food for human or animal consumption and the movement of commodities for other purposes, prepare schedules of priorities for the domestic movement of food, which the Office of Defense Transportation shall take into consideration in determining traffic movements.

Advisory Committee

7. (a) To advise and consult with him in carrying out the provisions of this Executive Order, the Secretary shall appoint a committee composed of representatives of the State, War, and Navy Departments, the Office of Lend-Lease Administration, the Board of Economic Warfare, the War Production Board, and such other agencies as the Secretary may determine to be concerned with the food program. The Food Requirements Committee of the War Production Board established by the Chairman of the War Production Board by memorandum dated June 4, 1942, is abolished

effective as of the date of appointment of said advisory committee. The Secretary shall receive from the members of such advisory committee estimates of food requirements, and consult with such committee prior to the making of food allocations under Section 1 (c) of this Executive Order. Such committee shall perform such other functions in connection with the food program as the Secretary may determine. The Secretary may, in his discretion, appoint such other advisory committees composed of representatives of governmental or private groups interested in the food program as he deems appropriate.

b. Section 1 of the Executive Order No. 9024, dated January 16, 1942, is amended to provide that the Secretary shall be a member of the War Production Board.

Powers of Administrator

8. The Secretary, in carrying out the responsibilities imposed on him by this Executive Order, may, subject to the provisions of this Executive Order, exercise the following powers in addition to the powers heretofore vested in him:

a. The power conferred upon the Department of Agriculture with respect to contracts by Executive Order No. 9023 of Jan. 14, 1942.

b. The power conferred upon the President by Title III of the Second War Powers Act, 1942, in so far as it relates to priorities and allocations of (1) all food for human or animal consumption or for other use in connection with the food program, but excluding that food which has been determined to be available to the War Production Board for industrial purposes pursuant to Section 3 of this Executive Order; (2) those portions of non-food materials, supplies and equipment which have been allocated by the War Production Board under Section 2 of this order for carrying out of the food program; (3) any other material or facility, when the Secretary determines that it is necessary, in order to carry out the provisions of this Executive Order, to exercise the priorities or allocation power with respect thereto: provided, that in order to avoid overlapping and conflicting action, prior to taking action pursuant to Item (3) hereof, the Secretary shall inform the Chairman of the War Production Board of the action proposed to be taken, and in the event that the Chairman of the War Production Board shall object, the issue shall be determined by the President or such agent or agency as he may designate. Contracts or orders, relating to the materials and facilities specified in this sub-section, made by the Secretary, or by any other officer or agency of the government at the Secretary's direction, and subcontracts and suborders which the Secretary shall deem necessary or appropriate to the fulfillment of any such contract or order, are hereby declared to be necessary and appropriate to promote the defense of the United States. The Secretary may assign priorities with respect to deliveries under any such contract, order, subcontract or suborder, and he may require acceptance of and performance of any such contract, order, subcontract or suborder, in preference to other contracts or orders for the purpose of assuring such priority. Allocations of materials and facilities under this subsection may be made by the Secretary in such manner, upon such conditions, and to such extent as he shall deem necessary or appropriate in the public interest, to promote the national defense, and to carry out the provision of this Executive Order.

c. The powers under the Act of Oct. 10, 1940 (54 Stat. 1090), as amended by the Act of July 2, 1942 (56 Stat. 467), and the Act of Oct. 16, 1941 (55 Stat. 742), as amended by Title VI of the Second War Powers Act, 1942, heretofore vested in the War Production Board by Executive Order No. 8942 of Nov. 19, 1941, Executive Order No. 9024 of Jan. 16, 1942, and Executive Order No. 9040 of Jan. 24, 1942, with respect to the requisitioning of food for human or animal consumption.

d. The powers of acquisition of property under the Act of July 2, 1917 (40 Stat. 241), as amended by Title II of the Second War Powers Act, 1942.

e. The powers of taking over and operating facilities under Section 120 of the National Defense Act of 1916 (39 Stat. 213) and Section 9 of the Selective Training and Service Act of 1940 (54 Stat. 892).

f. The powers with respect to antitrust prosecutions vested in the Chairman of the War Production Board by Section 12 of the Act of June 11, 1942, Public Law 603, 77th Congress.

g. The power of inspection and audit of the war contractors (including the power of subpoena) under Title XIII of the Second War Powers Act, 1942.

Delegation of Authority

9. The Secretary is authorized to delegate any or all functions, responsibilities, powers (including the power of subpoena), authorities, or discretions conferred upon him by this Executive Order to such person or persons within the Department of Agriculture as he may designate or appoint for that purpose. The Secretary may, except as otherwise provided herein, delegate to any appropriate Federal, State, or local governmental agency, officer, or employe, in such manner and for such periods of time as he shall deem advisable, the execution of any of the provisions of this Executive Order, together with any powers of the Secretary under this Executive Order. To the fullest extent compatible with efficiency the Secretary shall utilize existing facilities and services of other governmental departments and agencies and may accept the services and facilities of any State or local governmental agency in carrying out his responsibilities defined hereunder.

10. As used herein, the term "food" shall mean all commodities and products, simple, mixed, or compound, or complements to such commodities or products that are or may be eaten or drunk by either humans or animals, irrespective of other uses to which such commodities or products may be put, and at all stages of processing from the raw commodity to the product thereof in a vendible form for immediate human or animal consumption, but exclusive of such commodities and products as the Secretary shall determine. For the purposes of this Executive Order, the term "food" shall also include all starches, sugars, vegetable and animal fats and oils, cotton, tobacco, wool, hemp, flax fiber, and such other agricultural commodities and products as the President may designate.

11. In the event of any difference of view arising between the Secretary and any other officer or agency of the government, in the administration of the provisions of this Executive Order, such difference of view shall be submitted for final decision to the President or such agent or agency as the President may designate.

12. The personnel, property, records, unexpended balances of appropriations, allocations, and other funds of the War Production Board primarily concerned with and available for, as determined by the Director of the Bureau of the Budget, the discharge of any of the functions, responsibilities, powers, authorities, and discretions that are vested in the Secretary by this Executive Order are hereby transferred to the Department of Agriculture. In determining the amounts transferred hereunder, allowance shall be made for the liquidation of obligations previously incurred against such balances of appropriations, allocations, or other funds transferred.

Production and Distribution

13. To facilitate the effective discharge of the Secretary's responsibility under this Executive Order, the following changes are made within the Department of Agriculture:

a. The Agricultural Conservation and Adjustment Administration (except the Sugar Agency), the Farm Credit Administration, the Farm Security Administration, and their functions, personnel and property; the functions, personnel and property of the Division of Farm Management and Costs of the Bureau of Agricultural Economics concerned primarily with the planning of current agricultural production; the functions, personnel and property of the Office of Agricultural War Relations concerned primarily with the production of food; and the functions, personnel and property established in or transferred to the department by this Executive Order that are concerned primarily with the production of food, are consolidated into an agency to be known as the Food Production Administration of the Department of Agriculture. The Food Production Administration shall be under the direction and supervision of a Director of Food Production appointed by the Secretary.

b. The Agricultural Marketing Administration, the Sugar Agency of the Agricultural Conservation and Adjustment Administration, and their functions, personnel and property; the functions, personnel and property of the Bureau of Animal Industry of the Agricultural Research Administration concerned primarily with regulatory activities; the functions, personnel, and the property of the Office of Agricultural War Relations concerned primarily with the distribution of food; and the functions, personnel, and property established in or transferred to the Department of Agriculture by this Executive Order that are concerned primarily with the distribution of food are consolidated into an agency to be known as the Food Distribution Administration of the Department of Agriculture. The Food Distribution Administration shall be under the direction and supervision of a Director of Food Distribution appointed by the Secretary.

c. So much of the unexpended balances of appropriations, allocations, or other funds

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FOOD CAN'T BE TAKEN FOR GRANTED*

By MORRIS SAYRE
Executive Vice-president, Corn Products Refining Co., New York, N. Y.

The production, processing and distribution of the food which we and our allies must have to win the war is a complex enterprise. It is so complex, in fact, that without intelligent planning and administration, the food needed will not be available

This paper was prepared before a Food Administrator had been appointed, and the author considers the naming of Secretary Wickard to that position as a move toward the solution of the problems discussed.

IT is indeed strange that any human being could take the availability of food for granted, yet you are asked to give this availability aspect a bit of thought because we Americans *do* take food for granted—and that which we take for granted we can most easily lose.

There are some 30 million men, women and children engaged in agriculture on 6 million farms covering 300 million acres. These are necessary to produce our feed and insure your three squares in normal times. In 1941 they were producing for us 94 billion pounds of milk, 19 billion pounds of beef cattle, 14 billion pounds of hogs, 2 billion pounds of chickens, 47 billion pounds of wheat largely for flour, 17 billion pounds of corn processed into breakfast food, starch, sirup and sugar, 64 billion pounds of fresh vegetables—just to mention the more common foods. The fishing industry, which gives us over 4 billion pounds of valuable food, is likewise complex.

Then come the processors. Under a normal free economy food processing is effectively and smoothly handled by more than 50,000 plants. One out of every four manufacturing plants in the United States is processing food. Extensive research has given us greatly increased variety and improved quality in palability, wholesomeness and nutritive value. The skills and "know how" of over a million men and women engaged in this industry are well-nigh irreplaceable. The equipment that has been developed to process all these products is highly specialized, made of all sorts of materials and cleverly fabricated. Then there are supplies—such as bolting silk, filter cloth, activated carbons, chemicals, fuel, and so forth, besides an array of packages, tin, glass, paper, cloth bags, wooden and steel containers, all with their own production problems.

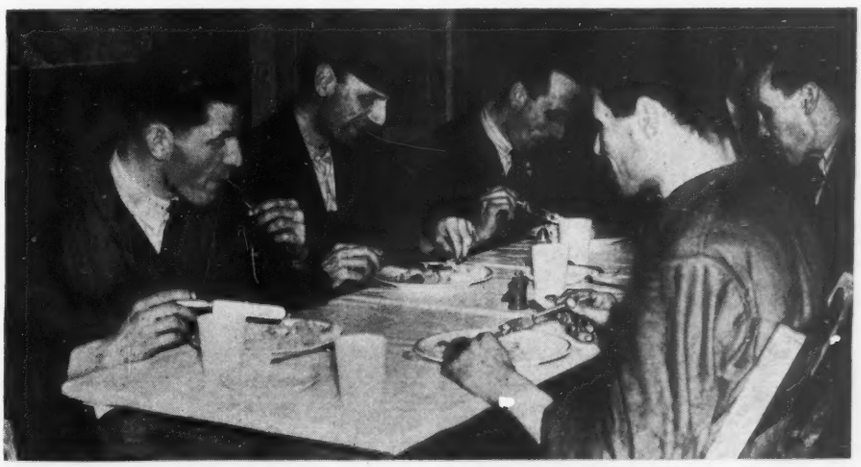
After the processors come our distributors—over a million men and women, 600,000 retail stores. One out of every three retail stores in the United States is a food store; $1 out of every $3 of family expense goes for food.

All three—producer, processor and distributor—are dependent upon highly organized rail, truck and steamship systems that provide a proper transport service where and when it is needed. They are dependent upon prices that permit them to continue. And finally, they are dependent upon an elaborate system of banks and other organizations for the financing of operations from seed to a package in your kitchen.

Have I not given you enough detail for you to appreciate how dependent this vast and intricate system must be on the full and free functioning of every unit if there is to be no shortage of food? So much can, and may, go wrong besides the weather, and it is time now to remind you that no longer are we operating in that free society under which the food industry has been developed.

Superplanning Required

For ten years we have struggled to adjust ourselves to something of a social revolution, involving the necessity of learning how to operate under many new controls. Judging by production, if not profits, we have been quite successful in this, though it is a bit early to know the full effects of these changes. Now, however, our free society temporarily disappears under the necessities of full war control. Month by month our food system is rocked not only by the impact of war's unprecedented demands but by directives that change completely, and at every step, our known and normal methods of procedure. To mix metaphors, if the wolf doesn't catch us on the horns of demand and directives, it will surely require superplanning, coordination and cooperation. If he does catch us, we will not only go hungry but lose the war.



English workmen enjoying food in a community kitchen. They know that food can't be taken for granted. And one of our jobs is to help feed them.

* Based on address at Annual Meeting of Grocery Manufacturers of America, New York, November 19, 1942.

Food and the War Program

Now let us consider the essentiality of food to the war program. There is plenty of psychological evidence to show that the very best morale builder is plenty of good food. Not only the Army goes on its belly, but armies of war workers here and abroad. The people of London became convinced that they could take all the blitz Hitler could send as long as they were adequately fed. Conversely, it is generally agreed that the people of France have been starved into submission. When one is hungry, they tell us, one can think only of hunger and not rebellion. Hitler has ruthlessly and brutally used this weapon of hunger not only on the French but in the Low Countries, Norway, Poland, Czechoslovakia and Greece. He has been reasonably successful with it in dealing with the bravest and most stubborn of peoples. Only food will restore this lost morale. Wisely, therefore, comes our President's new directive, promising food to all countries occupied by the United Nations, in striking contrast to the starvation policy of the Nazis. That policy will be effective in creating new allies to throw out the Nazi conquerors. Finally, as Sir John Orr points out, if we are to have a good peace, we must recognize the fact that the one need for *all* men in *all* lands, after the war, is *food*.

Well, we food people have taken on a large order, haven't we? First a soldier requires about 6 lb. of food a day, or 2,200 lb. a year—a greater weight per man than all his clothes and equipment, including tents, guns, field pieces, tanks and planes. Multiply that by eleven million and add vast stocks that must be available here and there wherever he goes. This is twice the present heavy demand of the men now in the armed service. Our civilians need nearly a ton apiece.

Next, the Lease-Lend food requirements, already heavy, seem only to have begun. So far it is reasonable to believe that our food goes only to British Empire countries, and some little to Russia and China. Soon we may be aiding Italy, The Balkans, France and Northern Europe—the sooner the better! That demand, on top of our own normal requirements, will be tremendous. Yet our home requirements are already abnormal as men leave farms to create new demands in new war industry towns.

Moreover, these greatly increased demands are not for just food. For "all out" combat and war production it must be *good, wholesome* and *well-balanced* food from the nutrition point of view. The American soldier is second to none, but he must be fed second to none. He must have that which

MORRIS SAYRE

will give him not only a strong body but an abundance of the energy that will enable him, under all conditions, to cheerfully carry on. A soldier recently remarked that there were some rations on which he could live a lot longer than he would want to survive! Our food must carry to him, in Africa or Alaska, Guadalcanal or Germany, vitality and a love of life to survive while Japs and Germans get what's coming to them. Also, this food must stay wholesome and sweet in any latitude. It must do as much for our Allies, equally dependent on its morale building power.

The Farm Labor Problem

Now let's take a look at our ability to supply such needs. We have pictured a marvelously organized and complex industry which normally supplies us. Farmers have complained of periodic surpluses, but these melt like frost in the glare of this universal demand. Nature may not always be as bountiful as in these last few years. Our farmers are a tough hard-working lot. They are of the stuff which made America, and they are patriots. However, they are now asked to produce greatly with less labor, less machinery, less supplies and more difficult transportation.

More than a million skilled workers left the farms in 1941, and they are leaving at a greater rate this year. Still, the essentiality of these men for producing food in the war program gets scant consideration from draft boards. Leaders who glibly say that untrained high school boys and women can replace strong and skilled farm labor are both ignorant and dangerous. Other farm workers go to build bombers, and create a new and serious demand for food they no longer raise. Processors faced with the same tremendously increased demand have the same labor shortage and for the same reasons. Surely, workers on farm and in factory must be made to realize the importance of their skill and effort to the winning of the war in their own vocations, rather than have it implied by ignorant and thoughtless authorities that inexperienced women and boys can do their work. Labor rightfully resents that implication, but for maximum production it must have both appreciation and encouragement.

Must Have Equipment

Then, both farmer and processor are dependent on equipment replacement and repair, on packaging and other supplies.

Is it not obvious that in the allocation of critical materials this next crucial year food should come next after war equipment, and in some cases perhaps at the same level? The Army would never send ammunition without food to Africa, yet we have planned the production of ammunition while taking food production for granted.

A Transportation Problem

Finally we are all dependent on railroads that have picked up all sorts of extra burdens and so far maintained a most remarkable service. We anxiously watch to see if they in turn are properly supplied with that which will enable them to carry the even greater load that this war program will soon impose.

Is there left any doubt that, if we are to win the war and not go hungry, food production is vitally essential? Already our industry shows signs of strain. With the greatest crop since the first Plymouth Colony Thanksgiving, we are confronted with shortages of beef, bacon, salmon and many canned products, besides importations like sugar. Only by the most careful and coordinated planning can we hope to stretch our productive, processing and distributing facilities to carry out this vast program. Only by such planning and execution can we avoid a national scandal and an international disaster.

Surely it behooves our authorities to begin now before it is too late to integrate the food industry, and plan for it as essential and secondary only to war materials, so long as the production of fighting equipment is not impeded by a food shortage. Then it behooves you and me, farmers and processors representing management to support such planning and make it work. No one wants to be taxed with the burdens of careless leadership, but we shall gladly sacrifice for any intelligent and responsible administration. Our farmers and processors so supported will do their part. Our vast personnel, if encouraged to stick at essential food production, will see us through. Without food we can lose the war. With food we shall indeed win it.

Packaging Requirements For Dehydrated Vegetables

By A. L. PITMAN, WILLIAM RABAK and HENRY YEE*
Western Regional Research Laboratory, Albany, Calif.

What a package must do to protect the quality of dehydrated vegetables is explained in this article. And the authors give the relative performance of various materials as determined by tests at The Western Regional Research Laboratory

PACKAGING materials for dehydrated vegetables are closely related to certain quality standards of the finished products. Among quality standards, moisture content is of great importance.

Tests at the Western Regional Research Laboratory have shown that within a range of 12 to 5 percent, and probably lower, differences of 1 percent are highly important in keeping quality. The packaging material must therefore perform effectively the task of keeping moisture away from the dehydrated product.

Packaging materials must meet other requirements, and these requirements will be discussed later. Chief emphasis has been placed on the measurement of the water-vapor resistance of packages containing dehydrated potatoes, and the results have been extended to packages for other dehydrated vegetables.

Influence of Moisture Content on Keeping Qualities

In 1918, 8 to 10 percent of moisture in dehydrated vegetables is said to have been common. As compared with present specifications, this is very high and undoubtedly accounts for much of the difficulty encountered with dehydrated vegetables during World War I. Even if the moisture content of a dehydrated vegetable is only slightly above the 5 percent commonly considered suitable for storage, the flavor, color and vitamin retention are all adversely affected in varying degrees. The effect of a 1 percent change is significant in reference to taste and to vitamin C retention. There is evidence that palatability and vitamins will be preserved longer if a reduction in moisture content is effected to lower levels than those now specified and commercially obtained. Most of the current tentative U. S. Army specifications require not over 5 percent moisture content.**

As a result of our work, we have reached the conclusion that for year-long storage in the tropics the moisture pickup by dehydrated vegetables in a container to be substituted for one of metal should not exceed 2 percent of the original weight of the package contents. This conclusion was reached independently of the similar conclusion of L. K. Harper.[1] Then, if the material is dried originally to 4 percent, instead of to 5 percent, the condition of the product at the end of a year's storage should be substantially the same as though it has been dried to 5 percent and held in an absolutely tight container.

Air—Influence and Elimination

The 21 percent of oxygen in air plays an important part in the deterioration of dehydrated vegetables. Carbon dioxide commonly results from the reaction of any oxygen present with the dried vegetables. This causes a decrease in oxygen in the storage atmosphere and a slowing down of the changes which occur. If, however, the product is sealed in any packaging material which is capable of admitting oxygen, this slowing down does not occur. The relative resistance of nonmetallic materials to the passage of water vapor, air and carbon dioxide varies many fold.[2]

As a means of displacing air, carbon dioxide and nitrogen are commonly used in conjunction with hermetically sealed cans and are specified for certain dehydrated vegetables by the Army and

** Army specifications are obtainable from Chicago Quartermaster Depot, Chicago. Or see *Western Canner and Packer*, June, 1942, page 32.

1—Cellophane No. 300. 2—Laminated amber glassine. 3—Waxed, supercalendered sulphite. 4—Cellophane, laminated, No. 600. 5—Rubber hydrochloride, No. 120UO. 6—Cellophane, laminated to sulphite paper, boxed. (See illustration on page 51 for larger types of containers for dehydrated vegetables.)

* Respectively, Senior Chemical Engineer, Associate Chemist and Under Scientific Aide, Western Regional Research Laboratory, Bureau of Agricultural Chemistry and Engineering, Agricultural Research Administration, U. S. Department of Agriculture.

Lease-Lend. The gas may be introduced by the use of a vacuum bell or other evacuated chamber in which the air content of the container is replaced, after evacuation, with one of the two gases mentioned. A second method is to thrust a purge tube to the bottom of a loosely covered 5-gal. can filled with the dehydrated vegetable. One cubic foot of the gas, measured through a gas meter, is forced to the bottom of the container through the tube. The gas to be used should be 50 percent in excess of the volume of the container. For a 5-gal. can, a gas meter showing 1 cu. ft. per revolution of a dial hand is suitable. The cover is kept over the hole as far as possible while the air is purged out. Tests have shown that with a cubic foot of carbon dioxide flowing into a 5-gal. can in 5 seconds, the oxygen left will be around 2 percent. With solid carbon dioxide ("dry ice") placed in the bottom of the can to be purged, we have reduced the oxygen content left in the can to 1 percent and are developing this method further.

Other Factors Affecting Storage

It is generally recognized that temperature is an important factor in the storage life of foodstuffs. For example, Kane, Wiseman and Cary found that the losses of carotene in dried alfalfa were reduced from 20 percent per month at 80 deg. F. to 5 percent per month at 50 deg. F.[3] Similar improvements in the storage life of dehydrated vegetables may be expected at lower temperatures.

Light probably accelerates the destructive reactions in dehydrated vegetables, but the extent of damage is not accurately known. The subjection of the contents of packages to light occurs only in commodities on display, the purpose being sales appeal. Military packages are not packed for, or subject to, display and therefore need not be exposed to light. Lease-Lend packages are in much the same class. Dried soups for retail trade are packed both in opaque and in transparent wraps.

The problem of insect infestation in cans of dried vegetables has been dealt with by Chace and Noel,[4] Cruess and Mrak[5] and by Essig.[6] Cooperative studies are now in progress by the latter and the Dehydration Committee of the Bureau of Agricultural Chemistry and Engineering in which the resistance of selected "moisture-vapor-proof" materials to insect attack is being studied. In the opinion of the authors, any need for fumigation of packages is remote in the case of dehydrated vegetables, which are less exposed to insect infestation than are sun-dried fruits. Furthermore, the low relative humidities in such vegetable packages are not best suited to insect life. Fumigation through heat-sealed, moisture-vapor-proof cartons would be difficult. If there is evidence of insect infestation in the packaging room or the product, the product and the empty packages should be heated to 135 deg. F. for 5 minutes immediately before packaging.

TABLE I—Coefficients of Water-vapor Permeability and Resistance for Package and Lining Materials

Exp. No.	Lining or package*	*K* Water-vapor permeability**	*R* Water-vapor resistance***
1	Asphalt-impregnated kraft bag. 5-ply: Wts. 50, 65A, 50, 65A, 60. A single unit with stitched and waxed ends. Asphalt, 25 lb. wt. per ream, basis 40-lb. sheet	0.21	4.7
2	Asphalt-impregnated kraft bag. 3-ply: Wts. 40, 65A, 50. Same construction of the ends	0.41	2.5
3	Two-ply, asphalt-impregnated kraft paper laminated to a heavy muslin core. Seams sewed, but not specially sealed	0.49	2.0
4	Cellophane, moistureproof, heat-sealing, transparent, in No. 300 gage, Type 52. Single bag	0.23	4.3
5	Ditto, but double bag	0.068	14.7
6	Cellophane, moistureproof, heat-sealing, transparent, No. 300 gage	0.4	2.5
7	Ditto, but No. 450 gage	0.46	2.2
8	Cellophane, moistureproof, heat-sealing, transparent type laminated to a sulphite paper, in a 3 x 3 x 4¾-in. carton	0.23	4.4
9	Cellophane, moistureproof, anchor-coated, crimp-sealing No. 300 gage made up as a triplex bag	0.23	4.4
10	Ditto, in a light-weight corrugated carton. 12-in. cube size	0.07	14.2
11	Cellophane, moistureproof, heat-sealing, transparent, laminated to 2-ply, machine-glazed kraft paper containing a layer of asphalt between the plies. Seams heat-sealed, sewed and waxed with carnauba wax. In a light-weight corrugated carton, 12-in. cube size	0.20	5.0
12	Cellophane, two sheets of No. 300 gage of moistureproof, heat-sealing, anchor-coated, transparent material laminated into a single sheet	0.13	7.6
13	Ditto, but in a light carton, 12-in. cube in size	0.033	30.0
14	Unbleached, supercalendared sulphite paper, 25-lb. basis wt. per ream waxed to 33 lb. with 135-deg. F. MP wax. Single bag	0.55	1.8
15	Ditto, as a double bag	0.20	5.0
16	Ditto, but using a special high-MP wax. Single bag	0.26	3.8
17	Glassine, using two sheets of 25-lb. basis wt. paper laminated to a final weight of 52 lb. Original paper was coated, in addition. Single bag	0.73–0.088	14–11
18	Ditto, as a double bag	0.023	43.0
19	Glassine, 18-lb. basis wt. waxed to 24 lb	0.35	2.9
20	Glassine, two sheets of 20-lb. basis weight laminated with 5 lb. of adhesive to form a 45-lb. sheet. Packages provided with a lip thermo-seal	0.14	7.1
21	Glassine, two sheets of opaque laminated to a finished weight of 45-lb. basis wt. then laminated to a sheet of 450 gage cellophane of moistureproof, heat-sealing, anchor-coated, transparent quality	0.018	55.0
22	Parchment, vegetable, double waxed 30-lb. basis weight paper to 38 lb. Single bag	0.43	2.3
23	Ditto, double bag	0.22	4.5
24	Waxed, nesting container with a circular, snap-in lid. Av. diam. 3 1/4-in., net height 1 3/4-in. Single sample tested, partly filled	0.12	8.3
25	Ditto, completely filled	0.21	4.8
26	Ditto, rewaxed lid, partly filled	0.026	38.
27	Ditto, rewaxed lid, completely filled	0.025	40.
28	Rubber hydrochloride, laminated to kraft paper	0.20	5.00
29	Rubber hydrochloride, type 120NO	0.15–0.16	6.7–6.2
30	Rubber hydrochloride, No. 140 gage, in a light corrugated carton, 12-in. cube size	0.12	8.3

* Single bags unless otherwise noted.
** *K*, water-vapor permeability, as grams water/sq. meter/24 hr./millimeter of mercury of water vapor gradient across the li ing.
*** *R*, water-vapor resistance, equals 1/*K*.

The package should be low in cost and obviously must not be constructed of materials that are short in supply, or unduly restricted by priorities. Some believe that the package should withstand immersion in water for a time. A test of this sort would be a good indicator of the effectiveness of sealing.

The most dependable containers for dehydrated vegetables are metal cans with hermetically closed lids. If carbon dioxide or nitrogen atmospheres are not needed, a double friction lid which is spot soldered may be satisfactory, especially if the lid is luted, since a hermetically sealed can is not required for a relatively high water-vapor resistance alone. Aluminum foil laminated with rubber hydrochloride (pliofilm), has been widely used in packages for retail dried soup mixes, but is not obtainable today. Single and duplex moistureproof cellophane bags are used extensively for various dry food commodities.

The Ideal Package

An ideal package for dehydrated vegetables should be impermeable to water vapor, oxygen, carbon dioxide and nitrogen. It should exclude all light and keep out insects. In the case of nonmetallic containers, the strength of the lining should be sufficient to resist puncture or bursting during shipment. The container should pack with little waste space for military and for naval use. Thus rectangular cans and boxes are preferred to cylindrical ones. The lining material should preferably be closed by heat sealing or other readily made seal. Tests have shown that sealing is an important hazard, as indicated by some of the data in Table I.

Wartime Limitations

Conservation Order M-81, issued February 11, 1942, by the War Production Board, limited the use of tinplate, defining available supplies for the current season. Under that order, the

present use of tinplate for dehydrated vegetables appears to be unlimited. (As amended on December 9, M-81 specifies No. 10 cans, 0.50 tin, chemically treated blackplate ends, for dehydrated vegetables.—*Ed. Note.*) Can manufacturers are submitting lacquered cans for trial. The Quartermaster Corps Subsistence Research Laboratory at Chicago has worked on some substitute nonmetallic containers (Isker[7]). Aluminum foil is under very close control and rubber hydrochloride is likewise. We have investigated substitute packages for the replacement of tinplate and rubber hydrochloride, and a summary of this work follows.

Experimental Measurement of Moisture-vapor Resistance

The initial emphasis was placed on accelerated tests in small envelopes, 7x9 in. in size. Experiments using the 7x9-in. envelopes were made in triplicate with an empty bag as a control. The contents were dehydrated vegetables of known moisture content. From other experiments the relations have been determined between the moisture content of these dried vegetables and the relative humidity of the surrounding air, *i.e.*, the air in the package. The experiments were carried out in a cabinet with recirculated air. The controlled and recorded temperature was 85 to 90 deg. F. and the relative humidity 85 to 90 percent. A standard ratio of 480 sq. in. of envelope per pound of contents was generally used.

The test was termed an accelerated one, since this ratio is ten times that of a typical cubical package proposed for dehydrated onions. The area of that package was 960 sq. in. and its net weight 20 lb. Obviously, water vapor will pass through an area of 480 sq. in. ten times as fast as through one of 48 sq. in. per pound, a ratio which is typical of a commercial container.

Later, the experiments were extended to the measurement of the water-vapor pickup by the contents of selected lined cartons of 1-cu. ft. size. Previous work, collected and correlated by Carson,[8] has indicated that the moisture pickup experienced by the contents of a sealed package can be expressed by a simple equation, very similar to a simple heat-transfer equation. The form of the equation follows:

$$K = \frac{W - W_o}{A\,(VPD)\,t} \qquad (1)$$

$$(VPD) = P_w \frac{(\%\,RH)_s - (\%\,RH)_e}{100} \qquad (2)$$

where K = water-vapor permeability (in (in grams per 24 hours per square meter per millimeter of mercury difference of water-vapor pressure).

W_o = the initial weight of the contents of the package (in grams).

W = the final weight of the contents (in grams after t days).

t = time of storage (in days).

A = effective area of the lining (in square meters).

P_w = pressure of saturated water-vapor at the temperature of storage, millimeters.

VPD = vapor-pressure difference between the outside and inside of the package.

$(\%\,RH)_s$ = percent relative humidity of air in the storage space.

$(\%\,RH)_e$ = percent relative humidity of air in the package itself.

Note: To convert pounds to grams, multiply by 454. To convert square inches to square meters, multiply by 0.00065.

In electricity and in heat-transfer work, the reciprocal of the conductance is called the resistance. Fawkes has suggested the use of the reciprocal of a water-vapor permeability term which he calls "water-vapor proofness."[9] In this paper the expression "water-vapor resistance" is used:

$$\text{Water-vapor resistance, } R = \frac{1}{K} \qquad (3)$$

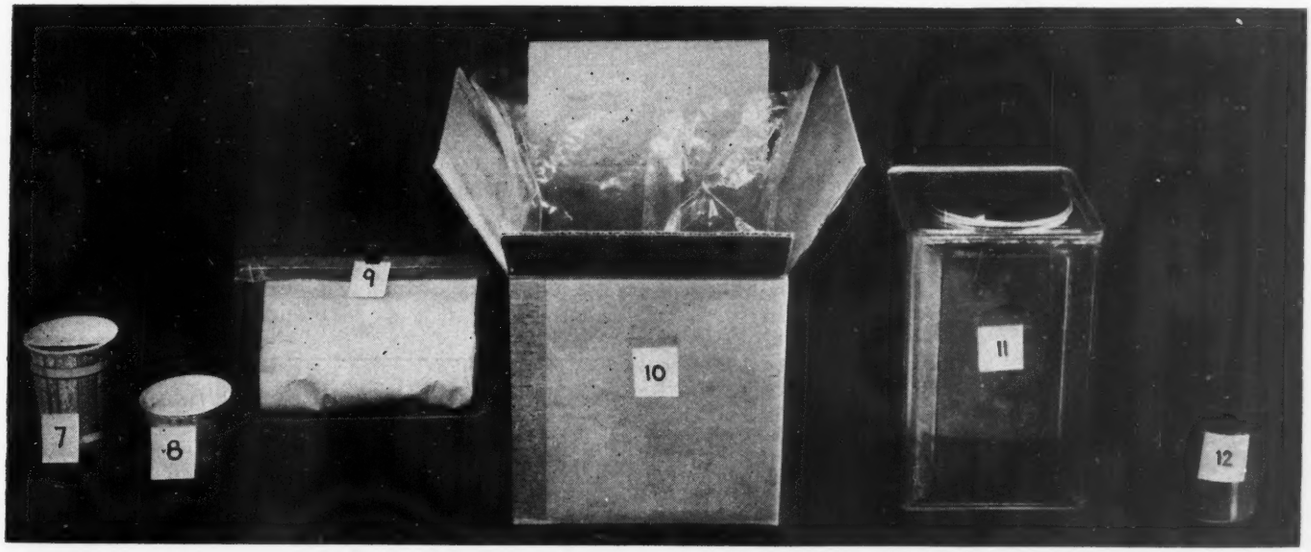
Results of this work, expressed both as water-vapor permeability and as its reciprocal, water-vapor resistance, are summarized in Table I.

Measurement of Permeability of Seals or Seams

Two types of cellophane bags displayed notably higher water-vapor resistances in 12-in. cubic cartons than in 7x9-in. bags (Table I, experiment Nos. 9, 10, 12 and 13). Rubber hydrochloride (pliofilm) was tested similarly in 12-in. cubic cartons and in 7x9-in. bags. The water-vapor resistance of the rubber hydrochloride, however, was essentially the same for the small bags as for the carton liners.

The water-vapor resistance was computed on a unit-area basis. The rubber hydrochloride sheet, then, behaved as though no moisture entered through the heat seals and as though the carton was of insignificant moisture-vapor resistance. On the other hand, the cellophane behaved as though the resistance was reduced in the 7x9-in. bags, in comparison with the 12-in. cartons.

The difference is believed to be due to the passage of moisture through the heat seal of the cellophane, at a definite rate. Apparently little or no moisture



7—Waxed nesting container. 8—Waxed nesting container. 9—Multiwall wraft, asphalt bag. 10—Cellophane-lined cubic-foot container. 11—Rectangular, solder-top can, 5-gal. size. 12—Black-iron can.

TABLE II—Relation Between Moisture in Dried Vegetables and Humidity of Air

Dehydrated vegetable	Percent moisture	Percent relative humidity
Cabbage	4	20
Potatoes, white, blanched, raw	7	38
Potatoes, white, precooked	8	45
Potatoes, sweet	7	40
Carrots	5	30

passed through pliofilm seals. Since there was a different ratio of length of seal to area of package between carton and bag, it is obvious that any moisture penetration through the seam would cause a difference in the water-vapor resistance.

Close and correct control of temperature, jaw pressure and time in the sealing machine are essential to the best heat seals.

The permeability of moisture-vapor through cellophane seals was estimated by the following method: For the 12-in. cubic carton the area used was 6 sq. ft. and the exposed seal length was 3 ft. Let K_f = water-vapor permeability of the sheet itself and K_{seal} = the permeability of the seal in grams per meter of length per 24 hours per millimeter (mercury) of water-vapor pressure difference. These results were computed:

	K_f	K_{seal}
Exps. Nos. 9, 10. Triplex cellophane	0.0260	0.0270
Exps. Nos. 12, 13. Laminated cellophane	0.0068	0.0160

Selection of Package Lining

An example follows in which a package lining is selected for water-vapor resistance. Let us suppose that potato cubes of 5 percent moisture content are to be packaged for hotel or restaurant use in a cubic-foot container and stored at an average of 50 deg. F., 60 percent relative humidity, for 180 days. A 3 percent increase in moisture, rather than 2 percent, is to be permissible of the low temperature of storage. The moisture content of most dehydrated vegetables when packed may not exceed 5 percent (U. S. Army tentative specifications).

The relationship between the percentage of moisture in some dried vegetables and the relative humidity of air at equilibrium with them at 99 deg. F. for present tentative moisture specifications is as given in Table II.

From experiments in connection with this work, the average relative humidity in the package will be close to 35 percent. This will result from the presence of dehydrated potatoes in the package at an average of 6.5 percent moisture content.

What value of the water-vapor resistance $1/K$ must the lining have, assuming there is no resistance in the outer container? Use the inverted form of equation 1:

$$\frac{1}{K} = \frac{A\,(VPD)\,t}{W - W_o}$$

From Table III, one cubic foot of potato cubes weighs 24 lb. The gain in weight is 24x3% = 0.72 lb.

Then $W - W_o = 0.72\text{x}454 = 327$ g.

A = area of the lining = 6x12x12 = 864 sq. in. (This does not include the area of the lining envelope which is folded into the flaps of a carton.)

So $A = 864\text{x}0.00065 = 0.56$ sq. m.

The saturated vapor pressure of water at 50 deg. F. is 9.2 mm. of mercury. Substitute in equation 2:

$$VPD = 9.2\text{x}\frac{60 - 35}{100} = 2.3 \text{ mm., the water-vapor resistance}$$

$$\text{Then } R \text{ equals } \frac{1}{K} = \frac{0.56\text{x}2.3\text{x}180}{327} = 0.7$$

Select a liner from the third column of Table I for which the value of water-vapor resistance $1/K$ is 0.7 or greater. Under these conditions, any of those materials shown should suffice. Some typical bulk densities and drying ratios are given in Table III.

Suggested Specifications

Some suggested specifications for substitute packages in military use are:

1. Heat sealing or other complete sealing method.
2. Strength of lining sufficient to prevent perforation or opening of the seam when packed and shipped or subjected to comparable drop tests.
3. Transmission of water vapor into the package to be not over 2 percent of the bone-dry weight of the contents if stored one year at 90 deg. F., 90 percent relative humidity, regardless of the package size. This condition is met in a 25-lb. package of 1-ft. cube size when the overall water-vapor resistance R equals 17 or more ($K = 0.07$ or less).
4. The sealed lining backed by its container should remain intact after being subject to a temperature of 130 deg. F. for 24 hours.
5. Materials should be such that satisfactory linings of up to 1-cu. ft. size of carton can be lined with a plain sealed envelope.
6. Linings should not crack at −15 deg. F. when handled in shipment.
7. Linings and packages should not impart nor absorb flavors.
8. Linings for cabbage and carrots must be capable of retaining carbon dioxide or nitrogen and of preventing the easy entrance of oxygen. Tentatively, oxygen should not enter the package at a rate faster initially than 1 percent of the gaseous volume per month.
9. Packages should be insect-proof or insect-repellant.

Conclusions

Double bags of supercalendered waxed sulphite paper approached the vapor resistance of the better glassines. Asphalt-impregnated kraft paper is noted for its water-proofness, but it was of inadequate water-vapor resistance for even a 4-month period under tropical conditions.

Heat-sealing cellophane may permit as much moisture to enter a package through a meter of heat-sealed length as through a square meter of the cellophane sheet.

Large packages of most materials will display higher moisture-vapor resistances than will small envelopes. The ratio of length of seal to area is usually lessened by an increase in package size.

Few materials were found resistant enough to hold the water-vapor absorption to 2 percent per year under tropical conditions—that is, a water-vapor resistance of 17 or more (Table I). A number were found to be effective in preventing more absorption than 2 percent in 4 months. The water-vapor resistance R required in the latter case is 5.7 or more. This group consisted of rubber hydrochloride base, now practically unobtainable for foodstuffs, duplex or triplex bags of moistureproof, heat-sealing cellophane, a cellophane laminated to cellophane, and coated glassines subsequently laminated. These glassines may be inherently heat sealing or may be provided with a heat-sealing strip at the lip of the bag. Sealed closures are considered desirable. That they are not essential is proved by the high water-vapor resistance of waxed nesting containers with waxed lids.

Package sizes of most use for military packages of dehydrated vegetables are 2 gal., 5 gal., and perhaps 1 cu. ft. in volume.

Actually, the sizes will depend on the availability of machines for the manufacture of large bags. Hand-made liners are practicable for the largest sizes.

Acknowledgments

We wish to express our appreciation for various suggestions from the Dehydration Committee: E. M. Chace,

(Turn to page 104)

TABLE III—Bulk Densities and Drying Ratios for Dehydrated Vegetables

Vegetable	Preparation	Lb./cu. ft.	Lb./5 gal.	Drying ratio (lb. raw prepared to 1 lb. dry)
Beets	3/16-in. slices	15	10	8–9
Cabbage	Shredded	7.5	5–7	10–15
Carrots	3/8-in. cubes	21	14	8–11
Onions	Flakes	14	9.12	9–11
Potatoes	Cubes	24	16	4–5
Potatoes	Strips	15	10	4–5
Yams	1/4-in. slices	18	12	3–4

New Caustic Peeling Method Reduces Waste, Saves Labor

By L. CHARLES MAZZOLA, Consulting Food Technologist, Auburn, N. Y.

Developed for peeling potatoes, the principle has application to other root vegetables and to some fruits. It utilizes a strong solution and quick penetration, with consequent high capacity. The inventor will grant licenses for use during war

Nota Bene: Patent applications have been made to cover this new method of lye peeling. During the war emergency, when every pound of food must be conserved, a license to use this method will be granted for a nominal sum after making suitable arrangements with the author.

• • •

We take this opportunity to compliment the public spirit of Mr. Mazzola in offering his invention for use during the war.—The Editor.

WASTE of valuable material in peeling potatoes and the expenditure of a large amount of labor in trimming them are problems of considerable importance to the food industry and to the nation. This is especially true in wartime when food and labor must be conserved. And with the enormous tonnage of potatoes to be dehydrated in 1943 these problems become even more significant.

Many of the larger users of potatoes try to reduce waste by selecting varieties with shallow eyes. Everything else being equal, these varieties show a little saving of material, since they do not have to be left in the abrasive peeler as long as the varieties with deeper eyes.

In practice, the factory manager has to determine whether it is cheaper to grind off more potato and save trimming labor, or to waste less potato and increase the trimming cost. He must weigh potato costs against labor costs and choose the least expensive procedure. I know from many years of experience that it requires close supervision, and any method that will eliminate this headache will be most welcome.

The average experience with abrasive peelers over a period of years shows that the waste is seldom as low as 20 percent and usually is from 25 to 35 percent or even 40 percent. But with the new lye peeling method described in this article, waste has been as low as 3 percent with new potatoes and never higher than 12 percent for old U.S. No. 1 potatoes, and the average is only about 8 percent. This effects a saving of 17 percent, or more, of the potatoes. It will also reduce trimming cost to about half the usual figure.

Lye peeling equipment is used in many plants for peeling peaches, using a 2 to 3 percent solution, with good results. Some canners of whole small potatoes are using an adaptation of this method. They use a solution of from 7 to 10 percent caustic and do a fair job of peeling in about 10 minutes' immersion, but their losses are high—about 25 percent. This high loss is due to the long period of immersion and the consequent partial cooking of the potatoes.

Strong Solution the Answer

The problem of accomplishing quick penetration to reduce the immersion time was approached from several angles. Many of the experiments were unsuccessful. Then a series of tests was made in which the caustic concentration was increased to what seemed absurdly strong solutions. This was the solution to the problem.

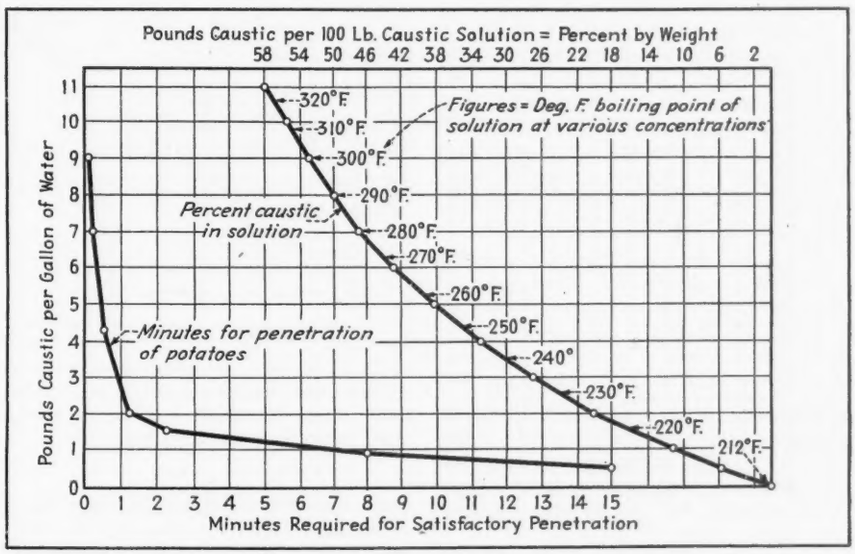

Pounds Caustic per 100 Lb. Caustic Solution = Percent by Weight
58 54 50 46 42 38 34 30 26 22 18 14 10 6 2
Pounds Caustic per Gallon of Water
0 1 2 3 4 5 6 7 8 9 10 11
320°F.
310°F.
300°F.
290°F.
280°F.
270°F.
260°F.
250°F.
240°
230°F.
220°F.
212°F.
Figures = Deg. F. boiling point of solution at various concentrations
Percent caustic in solution
Minutes for penetration of potatoes
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Minutes Required for Satisfactory Penetration

FIG. 1. Relation between caustic concentration and time of penetration and boiling point of solution. See text for examples of how to make practical use of the curves.

Figure 1 gives the average combined results of a large number of quantitative tests. The curve at the left is plotted from actual runs, and it indicates the relation between caustic concentration and time of penetration. These values will vary with every lot of potatoes, but their relation will not vary much. This is especially true as the caustic cencentration is increased.

The data represented by the curve at the left in Fig. 1 disclose the results rather dramatically. The moment the caustic concentration gets above 20 percent (2 lb. of caustic per gallon of water) the time factor is so reduced as to give the exact conditions desired. At a concentration of 53 percent caustic

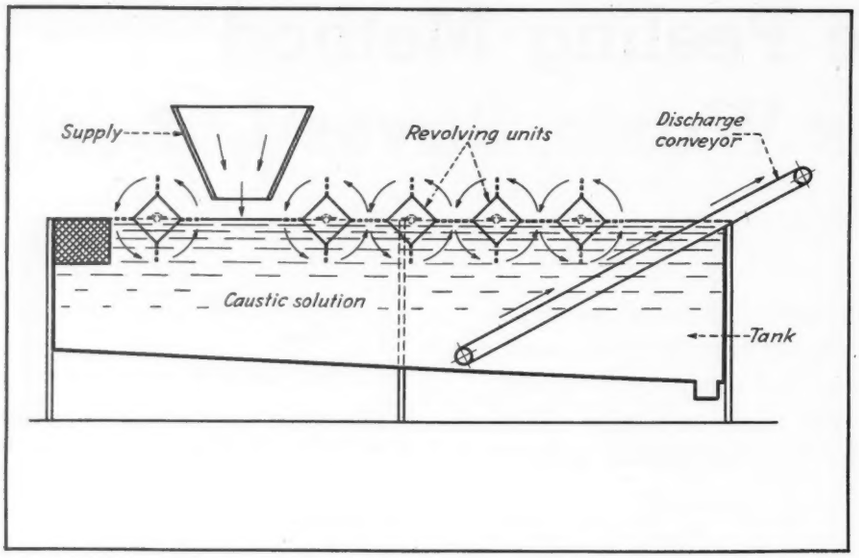


FIG. 2. Sketch of digester developed by author for immersing potatoes in caustic peeling solution.

(9 lb. of caustic per gallon of water) the immersion time is reduced to 10 seconds on old potatoes, with a total peeling loss of 7 percent.

From this curve it will be noted that with a concentration of 7 lb. of caustic per gallon of water it takes 20 seconds to secure a satisfactory penetration. Then going horizontally across the chart to right it will be seen that this solution will boil at 280 deg. F. Going vertically up from this point we find that we have a 47 percent solution by weight. This chart gives other practical information of value to the operator: If we have a caustic solution that boils at 260 deg. F., we find this temperature on the curve at right. Then read the figure vertically up from this point and we find that we have 39 percent solution by weight and to make up such a solution we need 5¼ lb. of caustic per gallon of water. This is determined by reading horizontally across the chart from 260 deg. F.

In using this chart for guidance in actual operation, care must be taken to make some allowance for the age of the potatoes and their condition due to storage temperatures and humidity and tuber diseases. All of these factors will affect the reaction involved and the losses.

Tests have been made showing that this method of lye peeling has no injurious effect on the finished product after standing for over one year.

By studying Fig. 1, we can see at a glance that not until we reach a soda concentration of better than 16 percent (1½ lb. of caustic per gallon of water) does the time element decrease sharply. From there on this change is most rapid. When this change is under control, we have a flexible process with all the advantages of the quick acting principle. We also have the dangers attendant upon a fast reaction which needs to be controlled.

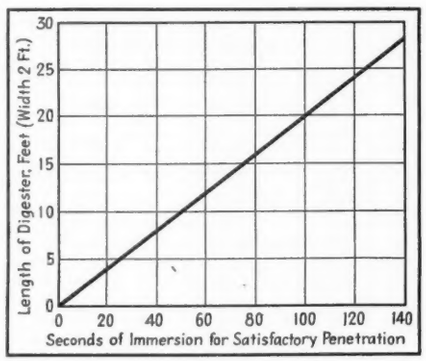


FIG. 3. Relation between capacity of the digester and its length and time of immersion. Data on length are based upon 4 tons of potatoes per hour input.

For the practical application of this discovery there is a wide range of choices — from a home-made manually operated line to a completely automatic line. With a really fast reaction, the time element becomes so important that an automatically controlled digester should be used to save waste.

A good production line using this discovery and also two new pieces of equipment will be described:

The first operation is to wash and soak the potatoes in hot water (about 200 deg. F.) in a standard vegetable washer. Then rinse and drain in a rotary or squirrel-cage type of washer. This rinse should be very hot water, and this is allowed to drain into the vegetable washer as new makeup water. The drained potatoes are now allowed to enter the digester.

The digester is to be made of black iron, as caustic will not attack iron very much. For a strongly resistant unit, a 5 percent nickel-iron alloy is recommended, though ordinary black plate will last a long time. The size of the digester can be calculated from the data shown in Fig. 1 and Fig. 3, according to the tonnage and speed of reaction used in each individual case. The important factors that must be borne in mind in selecting or constructing a digester, besides size, are these:

1. Provisions must be made for heating the caustic solution to the necessary temperature as determined by the caustic concentration selected from Fig. 1.
2. Potatoes have a lower specific gravity than any of the caustic concentrations employed, hence, they will float. Provision must be made to keep potatoes submerged in the solution while moving through digester.
3. Some arrangement must be provided for the removal of the potatoes from the caustic bath exactly on time.

Figure 2 is a sketch of a digester, designed by the author, in which all of the above requirements are met.

The immersion time for potatoes

(*Turn to page 104*)

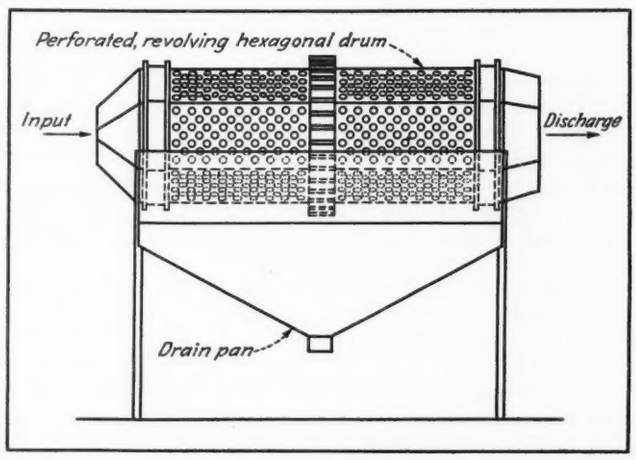


FIG. 4. Tumbler designed by author for removing peel and washing potatoes after they have left the digester. A hexagonal revolving perforated drum with holding lip at each end is used. There is a strong spray of water in center.

Army Standards For Dehydrated Foods

Tentative specifications for dehydrated foods for Army use have been issued by the Quartermaster Corps. "Food Industries" this month lists the requirements for dehydrated carrots, cabbage and onions. Changes in specifications previously published are also given

TENTATIVE specifications for dehydrated carrots, cabbage and onions were issued by the Quartermaster Corps on July 16 and 18, 1942. What these specifications are is told in the following paragraphs. To avoid repetition those parts of the specifications which apply to all three of the dehydrated vegetables are presented first, and then come the specifications which pertain only to the product named in the heading under which they appear.

General Specifications

The following are existing specifications which apply to the three dehydrated vegetables:

Tentative U. S. Army Specification No. 22-24, "Supplies, Subsistence, for the United States Army, Conditions Governing the Purchase of."

U. S. Army Specification No. 100-2, "Standard Specifications for Marking Shipments."

Quartermaster Corps Tentative Specification OQMG No. 12-A, "Packing for Overseas Shipment, Canned Fruits and Vegetables and Other Items of Subsistence; General Specifications for."

Methods of inspection and tests are the same for dehydrated carrots, cabbage and onions. These are as follows:

Inspection shall be made at point of origin unless otherwise specified. The test to show the peroxidase system (carrots) or catalase system (cabbage) shall be made according to accepted methods. Moisture determination shall be made by the vacuum oven method by drying 2 grams of the product at 70 deg. C. for 6 hours in partial vacuum having a pressure of not over 100 mm. mercury, or by any other methods which gives equivalent results.

Packaging Carrots and Cabbage

Packaging specifications are the same for dehydrated carrots and cabbage, which shall be placed in hermetically sealed cans in which the air has been replaced by nitrogen or carbon dioxide gas. The label on each container shall be marked with the name and type of product, the net weight in pounds, the month and year of dehydration, name and address of packer, location of processing plant, and specific directions for rehydration.

Domestic—The product shall be delivered in standard commercial containers, so constructed as to insure acceptance by common or other carriers for safe transportation at the lowest rate, to the point of delivery.

Export—The product shall be packed in nailed, wooden weatherproof solid-fiber or wire-bound wood boxes complying with the Quartermaster Corps Tentative Specifications OQMG No. 12-A. All strap iron and wire bands shall be securely fastened and the ends cut off or secured to prevent injury to clothing or hands. Shipping containers must be marked with the name and type of product, the gross weight of and the volume occupied by the container, the date of processing, the name of the contractor, the number of the contract or order, and date of packing. Ink used in marking containers shall take on wood or fiber, and shall be water-fast and sunfast.

Packaging Onions

Domestic, export and marking specifications for onions are identical with those for dehydrated carrots and cabbage. However, dehydrated onions must be packed in moisture-vapor proof containers of any of the following types, unless one type is specified: (1) Fiber drum with kraft asphalt barrier board lining and with body wall of not less than 0.060-in. thickness (not including lining), properly sealed; (2) 5-gal. black-metal can with baked-on sanitary lacquer, equipped with lever-lock or friction top (to be soldered in place after filling); (3) laminated paper base sealed bags, enclosed in weatherproof solid fiber box; (4) folding carton with inner liner of heat-sealing, moisture-vapor-proof cellophane of M.S.A.T. type or waxed glassine and with an outer wrapper of the same nature, or wrapped in kraft and dipped in a thermoplastic wax which will withstand satisfactorily a temperature of minus 15 deg. F. to plus 130 deg. F.

Individual specifications for the dehydrated carrots, cabbage and onions follow:

Dehydrated Carrots

Carrots, dehydrated, shall be such of the following types as may be specified in the invitation for bids: Type I, sliced; Type II, diced or cubed; Type III, stripped (Julienne style), and shall be of the grade indicated.

The carrots used for dehydration shall be clean, sound and mature, of deep orange color, and of good cooking quality. The dehydrated product shall be prepared under sanitary conditions and in accordance with best commercial practice. Carrots of No. 1 grade (except for size) should be used.

Preparation

The carrots shall be thoroughly washed to remove soil and foreign material, and sorted to remove any carrots that are diseased or otherwise damaged. The sound stock shall be peeled by any suitable means and trimmed. If the pieces are not cut immediately they should be kept under running potable cold water or in a clean 2 percent salt solution. In no case shall the material be thus held for more than 30 minutes.

Type I carrots shall be cut into transverse slices not less than 2/16 in. nor more than 4/16 in. in thickness; Type II carrots shall be cut into dice not less than 3/16 in. nor more than 6/16 in. in width and thickness; Type III carrots shall be cut into strips (Julienne style) not less than 3/16 in. nor more than 6/16 in. in width and thickness, and not less than 12/16 in. in length. If the cut pieces are to be held for more than 30 minutes, they should be kept under running potable cold water or in a clean 2 percent salt solution. In no case shall the cut material be thus held for more than 1 hour prior to blanching.

Blanching

The cut carrots shall be blanched in live steam until the peroxidase system has been destroyed. The blanched material should be dehydrated immediately and in no event shall it be held for more than 1 hour prior to dehydration.

Dehydration

The temperature and humidity of the air during dehydration shall be such that the product will not be scorched, case-hardened or otherwise damaged. The finishing temperature shall not exceed 160 deg. F. The dehydration surface shall be so loaded as to assure proper air circulation. This load will be ordinarily 1½ lb. or less per square foot.

Quality Standards

The dehydrated product shall possess a practically uniform characteristic color, a good, typical aroma, free from hay-like, scorched, musty or other objectionable odors. The moisture content of the finished product shall not exceed 5 percent by weight. It shall not contain more than 2 percent by weight of defective pieces. Regardless of the area of the defect any piece shall be considered defective if it is discolored in whole or in part (scorched, bruised or decayed), or if it shows areas of peel, insect damage or tray blackening. Not

(Turn to page 102)

Research Promises Relief From Starch Troubles

Difficulty has been caused by the interruption of supplies of tapioca starch. But modified cornstarch is now solving some of the problems and more important relief is expected from waxy maize and sorghum

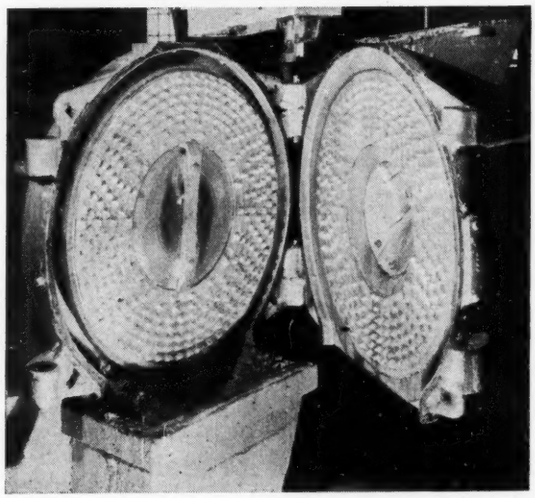


FIG. 1. Mill plates used to loosen the germ from the kernel in wet-milling corn for starch. This same mill can be used for waxy maize.

By R. S. McBRIDE
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THERE are two major types of starch used in industry, the cereal type usually made from corn, and the tuber type which has come from tropical sources, usually as tapioca made from the cassava root. Interruption of importation from the tropics has caused much worry among producers and users of food starches.

Cassava starch balls up into little beads, and these beads cook up to make the familiar puddings and other food products. Cornstarch does not ball up in this way, and does not cook up satisfactorily to make many of the products.

About 300 million pounds per year, or a bit more, of the tropical tuber starches were used in recent peacetime years. This includes the large quantities used in textiles and in paper making, where these starches have seemed really necessary to get the desired results.

Of the 300 million pounds, some was used on the basis of price comparison, some was due to users' preference, but in other cases the choice was that of necessity. Estimates vary widely as to the quantity of tuber starch which is really necessary. Some think that as little as 15 million pounds per year would serve, others estimate that as high as 150 million pounds is really needed. The wide variation in estimates undoubtedly depends on the way in which the estimator defines the term "needed."

There is an important advantage in the use of tuber starch to the extent of 25 to 30 million pounds per year, perhaps more. Beyond that point a great many users prefer the tuber type but would not be willing to pay very much, if any, price premium for it. Certainly, above 150 million pounds per year the uses are those for which it is customary that the purchasers get a price advantage from the imported starch seller. One can hardly assume that those who have thus bought at a lower price fall very much in the necessary class.

Cornstarch As Substitute

By modification of cornstarch it is possible to produce much the same performance characteristics in textile, paper and other uses. This modification of normal starch costs a little, and makes the price of the modified cornstarch a little higher than for the usual types. At present, in a technical sense, many of those who normally use tuber starch from imported cassava are being very satisfactorily cared for by modified cornstarches. (The disadvantage rests solely in the fact that this new starch is a bit more expensive than the imported tuber starches were formerly.)

In a number of cases, those who have commonly employed tropical starches can get satisfactory results by changing their technic of use when they purchase cornstarch instead. Thus research on both the making and using of domestic starches is helping greatly to solve the problems.

As yet the domestic manufacturers of cornstarch have not been able to prepare modified products or modified methods of use which will serve all of the purposes desired by food manufacturers. They therefore have been seeking an alternate raw material. This has been found in two agricultural products that can be used practically—waxy maize, or corn, and waxy sorghum. These two cereals furnish a starch that behaves during use like a tuber starch. There are certain other waxy grains, including rice and barley, which have starches of similar characteristics, but these do not promise so much in practice as yet. Hence agricultural and industrial research is being concentrated on the varieties of corn and sorghum which are called "waxy."

Why Starches Differ

Science has not yet explained exactly why starches differ in behavior. They all have substantially, if not exactly, the same chemical composition. The physical characteristics and behavior probably vary because of a different structural assembly of the starch units in the molecule. Some recent work indicates that there is a more or less highly branched grouping of the starch units in the molecule which makes the tuber starch more desirable for the manufacture of certain adhesives and for certain paper, textile and special food uses.

Research workers of the Department of Agriculture and several state experiment stations have for years been breeding varieties of corn and sorghum which gave novel starches, but until the interruption of the supply from the Netherlands Indies the research seemed little more than academic. Now it has become of great practical importance. Several thousand bushels of waxy maize seed were produced in 1942 by the joint effort of Iowa State College and American Maize-Products Co.

If the expected progress is made,

there may be enough waxy maize grown in 1943 to give us between 10 and 30 million pounds of starch from corn which has the characteristics of a tuber starch. There is every reason to believe that this is going to be the major single contribution to the solving of the tuber-starch problem. But unfortunately, the starch from the 1943 crop cannot be made available in industry until about the beginning of 1944.

Certain varieties of waxy sorghums also have been developed in the United States. These sorghums have been grown somewhat for grain, but more commonly for forage or silage crops. They have the great advantage of being able to develop and mature on a semi-arid land which is not satisfactory for most other feed crops. Hence, western Nebraska and some other areas along the edge of the Dust Bowl promise to grow waxy sorghum to a limited extent regularly, irrespective of the demand for the starch.

Starch-making Problems

Apparently waxy maize can be milled into industrial starch by almost exactly the same processes as are used on normal corn for ordinary cornstarch manufacture. The minor variations in plant practice which are necessary are being developed by the industry at this time. Unfortunately, the quantity of grain which can be diverted from seed to milling experimentation is relatively small, but it does not seem likely that there will be any serious difficulty in milling the 1943 crop when it is ready. The methods, and apparently the costs, will be much like those with normal corn. The main disadvantage is the fact that the farmer does not yet get quite as many bushels of waxy maize per acre as he does of the ordinary type of maize (corn).

The milling of waxy sorghum is quite a different matter. Starch of the desired characteristics cannot be milled from it with the normal wet-milling methods used to process corn, due primarily to the red coloring in that variety of waxy sorghum now most grown. At present the most promising outlook is for two-stage milling. First, the sorghum will be processed like wheat by dry-milling to make flour or grits. This first milling removes the bran which carries most of the unwanted color of the seed, and leaves flour or grits which can then be converted into starch by normal wet-milling processes. Actually this procedure is being followed at the present time by one of the largest food users of tapioca starch. That firm may thus in part supply its tapioca customers with a tuber-type starch from a cereal source. The cost is higher than normal but not prohibitive when the importance of maintaining brands and types of tapioca pudding are considered.

Potato-starch Supply

A great many people have thought that some day the United States would have a large potato starch industry. Actually that development has not been encouraged by economic conditions.

It is not profitable for American agriculture under most circumstances to grow potatoes for starch. The occasional surpluses and culls which are made into starch do not form a very satisfactory economic basis for a regular business. Nevertheless, the production of starch from white potatoes has gone on at least intermittently in this country, especially in Maine.

The manufacture of sweet potato starch has had the encouragement of extended government research and there is a small regular manufacture in the United States at one or two plants in the Southern states. Here again, economic considerations and the hesitancy of farmers to change their cropping practice have been serious causes of delay. Even under the stimulus of present wartime demand it has seemed impractical to have extensive development of sweet potatoes as a starch crop. And the prospective development of waxy maize rather implies that the economic considerations for a sweet potato starch industry may be less favorable in the future than in the past. Nevertheless, it is much too early to write off the potato starch business as a whole.

Dutch Competition

Java and other Netherlands Indies sources have been the major source of imported cassava and tapioca starch. The cost of production there has been quite low, partly because of the very low wage rates paid to labor.

The Dutch competition has included one characteristic of very substantial importance. That is the maintenance of quality standards. Export of cassava products from the Indies was restricted by government action to prevent low-quality material coming to the United States. A certain standard of quality was maintained even when the starch was going to be used for purposes for which this relatively high quality was not really necessary. How soon cassava starch will again be available from the Netherland Indies depends, of course, on war and postwar developments.

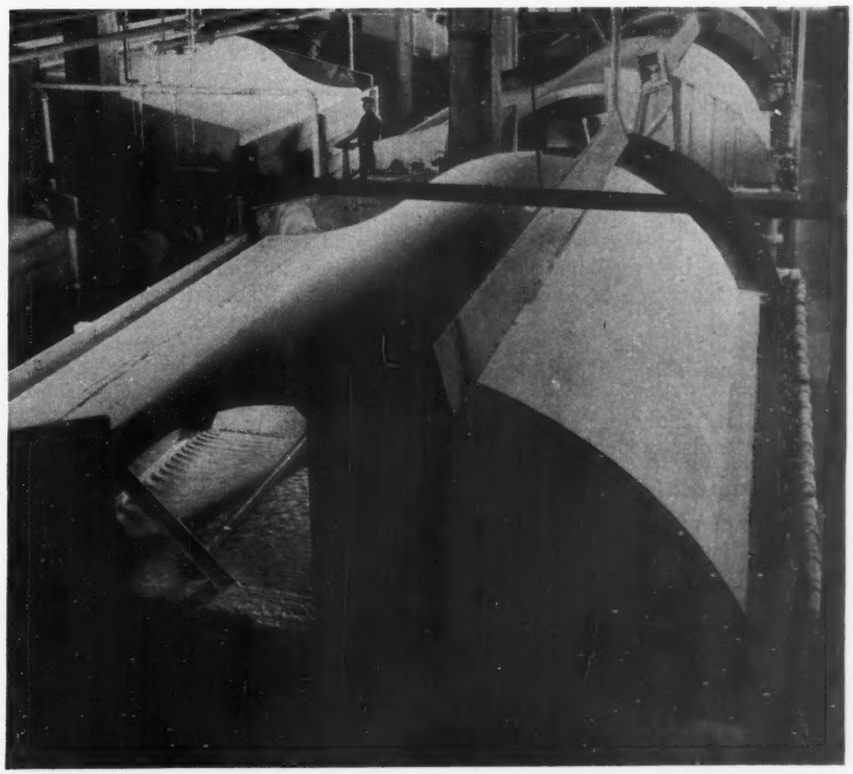

FIG. 2. Filters or washers used for the final separation of gluten and starch. These could be used in processing both waxy maize and waxy sorghum. Colored portions must be removed from sorghum by a preliminary dry-milling process.

Chemists Adapt Pectins To New Industrial Uses

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PART II—Specialty products can be made with only minor changes in normal canning plant routine, through use of pectin-320. These developments are suggested now for their value in postwar planning. Practical manufacturing methods are outlined here

WE have already referred to the use of modified pectin preparations for low-sugar jellies such as certain types of salads, consommes, aspics and puddings. We mentioned that low equivalent weight pectins do not require sugar for jelling, are relatively stable to heat and storage, and give jellies with controllable melting points. Preliminary work indicated that the pectins having an equivalent weight of 290 to 335 were best suited for these purposes. For convenience these pectins are hereinafter grouped and referred to as "pectin-320." Some of the industrial applications already developed and now ready for promotion by commercial canners and specialty merchandisers are: Canned fruit salads; canned vegetable salads; canned tomato aspic; canned vegetable juice aspic; canned jellied consommes; specialty high melting, gelatine-like, flavored dessert powders; milk pudding powders similar to rennet powders, but with marked advantages over rennet; wine jellies, low in sugar.

Application of pectin-320 to a few of these products will be described. Each of the products selected for description is representative of a large group of similar products.

Canned Jellied Salads

The commercial pack of canned fruit salad and fruit cocktail now runs into better than 5,000,000 cases annually. Since much of this eventually finds its way into jellied salads, it has often appeared desirable to can a ready-to-serve jellied salad. Much work has been undertaken in an effort to adapt a gelatine to such a product. The most difficult problems involved in its use are setting the jell under conditions that will permit an even distribution of the fruit, retention of such distribution throughout the shelf life of the product and inhibition of eventual breakdown and liquifaction of the jelly base. To date, a generally acceptable gelatine salad has not been developed.

Because of its special properties, pectin-320 is particularly adapted to the preparation of canned jellied salads of all types—fruit salads, vegetable salads, and so forth. The jelling technic consists in forming a jell with pectin-320 and tricalcium phosphate. The setting time or rate can be controlled by certain buffer salts, and varied between wide limits.

Method of Adding Pectin

Pectin-320 is prepared in two forms, "dispersible" and "regular." The dispersible form can be added directly to an agitating liquid without danger of lumping. The regular form must be dispersed in sugar or some other type of solid before it is added to a liquid or else it lumps badly. It is, in general, more difficult to handle than the dispersible type. For fruit sirups, where sugar is available for dispersing, either form would be satisfactory. Let us assume that in the present instance it is found desirable to use dispersible pectin.

In general, the technic for preparing the sirup would consist of adding the dispersible pectin to the proper amount of water, followed by the sugar and buffer salt. The solution is heated and stirred until it comes just to a boil. The proper quantity of tricalcium phosphate is added as a water slurry, the mix brought to a boil again, and it is then ready for use. To prevent jelling in the sirup tank or the feed lines, the mix should be kept above a temperature of 175 deg. F. at all times.

The quantity of pectin required depends to some degree upon the texture or firmness desired. We have found a sirup containing 1.12 percent of 400-deg. pectin-320 most satisfactory for this purpose. This is equivalent to 0.45 percent pectin-320 in the finished can of salad.

Canned Fruit Salad

The fruit is prepared separately, then mixed in the proportions of 50 percent peaches, 30 percent pears, 10 percent pineapple, 8 percent grapes and 2 percent cherries.

Mix until uniform and then place in the can so that the fruit represents 60 percent of the net contents.

A sirup is then prepared containing:

	Percent
Sugar	40
Dispersible pectin-320 (400 deg.)	1.12
Sodium citrate (buffer)	0.20
Tricalcium phosphate (TCP)	0.25
Citric acid	0.50
Water	57.93

FIG. 1. Fruit salad jellied with pectin-320. This was canned in September, 1940, and photographed as removed from the can at room temperature two years later.

Add the pectin to the rapidly agitated water and stir until thoroughly dispersed, then add sugar, buffer and citric acid and bring the mixture to a boil while stirring. Add the tricalcium phosphate dispersed in about 10 parts of water. Bring to a boil and shut off steam. A good grade of 150-mesh TCP is essential. Hold at 180 deg. F. and run into a filler for siruping fruit-filled cans.

Proceed in the regular manner to fill the containers with sirup and process. Cool the cans in an agitating cooler until the center temperature is reduced to 100 deg. F. Dry the cans and stack.

Let the cans remain undisturbed for at least 24 hours to jell properly.

Samples of jellied canned fruit salad prepared in the above manner have been held in storage for 18 months at normal temperatures and for 9 months at 100 deg. F. without any visible change in flavor or texture. No deleterious action on the can has been observed throughout the period of these tests.

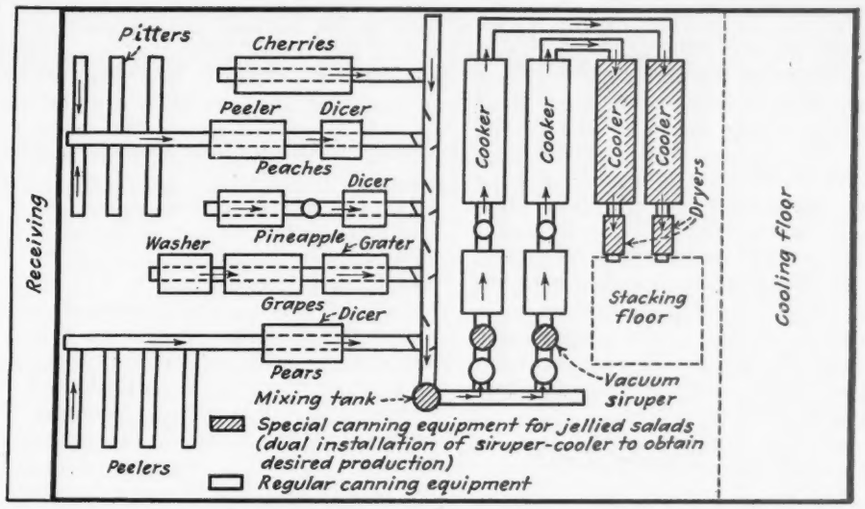


FIG. 2. Sketch from laboratory notebook showing how new equipment required for handling pectin-320 fruit salad would fit into normal canning plant equipment and routine. This layout is for a typical fruit salad canning line handling a pack of 250,000 cases in a 45-day operating period.

Precautions in Canning

In the canning of fruit salad, and more particularly fruit cocktail, it is customary to place the fruit in the can in layers and then cover with sirup. If this preparation were jellied it would show a stratified condition, peaches in one layer, pears in a second, and so forth. To avoid this, it is necessary that the fruit go into the can as a uniformly distributed mixture. The mechanics of such an operation is up to the individual canner or the particular plant in question, but should not present any serious operating difficulties.

Siruping—The sirup is prepared in the usual manner with the desired amount of sugar. The pectin-320 buffer salt and tricalcium phosphate are dissolved in the sirup. This causes no difficulty if properly handled. Because the increased viscosity makes the sirup difficult to handle in the ordinary gravity sirupers, vacuum sirupers are suggested, although not essential.

Cooling and Drying—In order to get a uniformly dispersed mix, it is necessary to bring about the jelling in a rotating cooler. The cooler should be of sufficient length to reduce the center temperature of the can to 100 deg. F. or less. Because of the low cooling temperature, the stacked cans may be likely to rust. It would appear advisable to include a small tunnel dryer in the tail-off line to insure control of this condition.

It should be kept in mind that pectin-320 is a specialty product, and as such, variations from a proved formula, such as that described, should not be made without some expert advice or some experimental tests to act as a guide.

With the obvious modifications, the above technic can also be applied to vegetable salads, or any other combination of solids dispersed in a jelly base.

In passing, it should be noted that the example covers a 40 percent "choice" sugar sirup salad. This sugar concentration is not essential for proper jelling. Fifteen or twenty-five percent sugar sirups would jell equally well.

The advantages of pectin-320 when used in canned salads of the above types are threefold:

1. Greater freedom from hydrolysis at the desired pH during sterilization of can and contents.
2. Better control of setting time which facilitates a uniform distribution of solid pieces and jelly.
3. Formation of a jelly which has no tendency to liquify at summer temperatures, with resulting separation of fruit and jelly.

Canned Jellied Consomme

Because of special properties and high jelly melting point, pectin-320 is especially suited for use in jellied consommes, madrilenes, and so forth. In contrast to gelatine consommes which require chilling to assure jell formation, pectin-320 consommes remain jelled at room temperature, but can be refrigerated without adversely effecting the tenderness of the jell. In addition, when heated to the normal serving temperature of soups, the pectin jell melts to contribute a desirable "body" to the hot soup.

Because of the absence of solid matter in which to disperse the pectin, it is essential that dispersible pectin be used in this type of product. The operations are simple and readily adapted to normal plant routine. A typical example of the preparation of a canned jellied consomme follows:

To each 90 lb. of prepared soup stock, add 0.7 lb. of standard dispersible pectin-320. This is stirred into the soup stock rapidly and the mixture brought to a boil.

To ten pounds of soup stock, add 0.14 lb. of monocalcium phosphate and stir until the phosphate is thoroughly wetted and well dispersed. The whole is then brought to a boil. If desired, the calcium slurry can be prepared from water rather than from soup stock.

The calcium mix is added to the pectin soup mix while stirring, and the combined mixture brought to a boil. Consomme is then filled into cans and the cans are processed, cooled, stacked and labeled by the customary procedures.

The two important points in the preparation of such consommes are the use of the dispersible form of pectin-320, added to the soup stock rapidly while stirring, and having the calcium slurry well dispersed and above 175 deg. F. before it is added to the pectin-containing base. With these two modifications in mind, the remainder of the canning operation is routine.

The texture of the consomme may be varied by regulating the amount of pectin used. The monocalcium phos-

phate requirement should be maintained at 20 percent of the pectin weight when such variations are made.

Changes in the pH of the soup base will exert a very pronounced effect on the jelling action of the pectin. For this reason, the example cited above would have to be modified for the preparation of madrilene type soups where the pH is considerably lower. Such modifications might include the addition of buffer salts, the use of tricalcium phosphate or a reduction in the pectin requirement. These changes should only be made upon expert advice or upon the basis of laboratory experiments.

Canned Tomato Aspic

The use of pectin-320 for preparing jellied tomato aspic involves little or no additional equipment other than that found in the ordinary tomato canning factory. The entire operation, aside from preparing the juice, consists of dissolving the pectin in the tomato juice and adding the necessary spices and condiments, followed by the addition of tricalcium phosphate to the boiling spiced juice. It can readily be seen that this operation would only involve the use of a large tank, equipped with a proper heating coil and a motor-driven agitator.

The type of pectin to be used would depend to a great degree upon the juice extraction process of the individual canner. At the present time, two methods of juice extraction are common; the "hot break" system, so-called because the tomatoes are heated and pulped prior to extracting the juice, is favored by many canners because it facilitates release of the natural tomato pectin and results in a more viscous juice. In the "cold break" system, the juice is extracted without any preliminary heating.

If system No. 1 is used, the preferred type of pectin would be regular pectin-320. This material dissolves more easily in a hot solution and is less likely to clump and gum if properly handled. Proper handling would consist of mixing the required amount of pectin, sugar, salt, acid and any other bulk materials together. In this manner, an intimate dispersion of the pectin is secured. The mix is then fed into the vortex of the rapidly churning hot juice. After the pectin is added, the juice is brought to a boil while stirring, and boiling is continued for three to five minutes. The proper soluble spice ingredients are then added, and these are followed by the addition of the required quantity of tricalcium phosphate. The latter is added as a thin paste, dispersed in about five times its own weight of water. Boiling is continued for another three to five minutes, and the material is then sent through the viscolizers and to the filling machines. After the cans are processed, they should be disturbed as little as possible during the jelling period. It is advisable to make this period 24 hours.

For the second method, where the cold break system of juice extraction is preferred, we would recommend the use of dispersible pectin-320. The advantage of this particular material is that it can be added directly to cold juice without being previously dispersed in sugar or other dry ingredients and without danger of lumping or gumming. In handling the material, the proper amount of pectin is weighed out and fed rapidly into the churning tomato juice. The juice is then brought to a boil, held three to five minutes, followed by the addition of the spices and tricalcium phosphate as in the previous method. From this point on the technics are the same.

A typical example of the preparation of an aspic follows:

Ingredients	Pounds
Cold tomato juice	100
Dispersible pectin-320 (250 deg.	0.835
Salt	1.5
Citric acid	0.334
Tricalcium phosphate	0.251
Spices to meet desired flavor requirement	

Add pectin-320 to rapidly churning juice, then heat to a boil while agitating, and hold at the boil three to five minutes. Add salt, citric acid and spices or spice oils, then tricalcium phosphate dispersed in about one pint of water. Continue boiling for three to five minutes while agitating. Viscolize (if desired), fill into containers and process as usual. Cool and stack, leaving undisturbed for 24 hours.

Miscellaneous Applications

Additional uses suggest themselves, such as the preparation of jellied junior foods and baby foods wherein the pectin would contribute special antidiarrheic properties, its use for low-sugar diabetic jellies, cranberry sauce and products of that nature, rennet-like pudding powders to be used in conjunction with milk for dessert puddings and many other items customarily packed in cans, in glass or in dry powder form.

As yet we have not been successful in utilizing pectin-320 as a jelling agent in canned jellied meat products. In this instance it suffers from the same fault that gelatine has in low pH ranges, as both are much less stable at the pH ranges normally found in meat products and as such are degraded and liquified very rapidly during the heavy sterilization required for most canned meats.

Another very obvious use for pectin-320 should be met with considerable caution. That is its use as a jelling agent for low sugar jellies wherein the sugar content would be under 50 percent. On the surface this would appear a very desirable means of utilizing a large percentage of the fruit and berry crop without requiring the tremendous amounts of sugar that would ordinarily be consumed by such preserves. From the commercial preserver's point of view such a product could be handled without difficulty inasmuch as he is ordinarily equipped with the required sterilization machinery and is familiar with the technic of sterilization. However, the merchandising of such an article would be faced with two large problems:

It is definitely contrary to present food and drug regulations to market a product of the nature of preserve or jelly wherein the sugar content is less than 65 percent.

Such a product could be produced and stored without difficulty as long as it remained unopened after sterilization, but the low sugar content would be conducive to rapid spoilage by mold and bacteria once the product had been exposed to the air. Its eventual spoilage would then be only a matter of a very short time and this would undoubtedly prejudice the consumer against further purchases.

From the household consumer's point of view, the merchandising of pectin-320 as a possible jelling agent for the preparation of low-sugar jellies would seem very desirable to those households where economy is the major factor. However, domestic kitchens are not ordinarily equipped with either the means, material or knowledge required to produce sterile products. Jelly prepared under the usual household conditions and using routine jelly making technics would undoubtedly be a total loss in periods ranging from a few days to a few weeks.

Future Developments

From the commercial canner's point of view so many of the items referred to above are definitely of a specialty nature that their actual merchandising must be discouraged for the war period. However, the highly specialized nature of each canner's process is such as to require adaptation of the more general recommendation made herein; therefore, it might be desirable to utilize the present for research and development of such products for postwar promotion.

Sudser Saves Soap in Washer

Compressed air discharges into soap solution to form suds which falls onto revolving brushes. Avoids contamination

By IRVING FEINBERG,
Research Chemical Engineer, Citrus Improvement Co., Sanford, Fla.

CUSTOM has dictated the use of long soaking tanks for washing citrus fruits. To soften and loosen the dirt, soot and scale which might be present on the fruit, the entire batch of fruit must pass through the soaking solution, staying immersed for periods ranging from two to five minutes and at a temperature as high as 120 deg. F. Subsequent passage over stiff, revolving palmetto brushes accompanied by a water spray cleans most of the soiled portions from the fruit.

This method has certain drawbacks. The expense of charging 800- to 1,200-gal. tanks with cleaning agents, such as trisodium phosphate, borax or soap, is high. Then the solution becomes quite filthy after a short period of use, and development of strong odors in the soak water necessitates frequent changes, with the accompanying expense. Moreover, the long soaking periods at the relatively high temperatures cause a certain amount of undesirable drying of the oil cells in the fruit rinds. And fruit containing various stages of rot disperses the mold spores throughout the soaking tank to contaminate sound fruit.

Spraying a soap solution directly onto the revolving washer brushes has many advantages over the soaking tank. But the amount of soap solution required to cover the wide brushes is great and its cost excessive. Applying concentrated liquid soaps in very fine jet sprays is not satisfactory owing to poor coverage of the fruit and stoppage of the jets.

Because of these difficulties the citrus soap-sudser has been devised, and it has proved highly satisfactory. As shown in the accompanying sketch, the sudser is essentially a soap-solution reservoir (*A*) extending across the washer parallel to and above the transverse brushes (*B*). This reservoir is enclosed except for a longitudinal opening (*C-C*) facing downward over the brushes. A compressed-air line (*D*) running through the bottom of the reservoir contains small jets or graduated openings (*E*) through which air discharges into the soap solution. The liquid level (*L*) in the reservoir is kept constant by means of a secondary reservoir (*F*) containing a float valve (*G*). This secondary reservoir is attached to the main reservoir and feeds into it through a small opening (*H*). It receives its solution from a large storage tank (*J*) located somewhere above and feeding by gravity through the ball float valve.

Compressed air discharging from the openings in the air line develops a dense suds in the soap solution, and suds is forced from the reservoir—or sudser, as it is termed—by the pressure of the suds behind it. The suds leaves the reservoir through the longitudinal opening either in sheets or in large globules—depending upon the composition of the soap solution—and completely covers the washer bed over which the citrus fruit must pass. The fruit, being actually covered with suds while on the revolving brushes, is cleaned readily. The used suds goes to waste, so there is no chance of subsequent contamination by it. The amount of soap used this way is quite small in comparison with a direct spray, the soap being in its most extended form.

Additional advantages of this method of suds application are less scratching of the fruit and less wear on the revolving brushes, the latter advantage being attributable to the lubricating effect of the suds on the fruit. The soap also tends to keep the brushes free from certain molds that form at the base of the bristles and cause them to rot off and shed. The saving in brushes alone has in many cases more than offset the cost of the soap.

It has been found that the ability of the sudser to perform satisfactorily is dependent on its being able to pass a large enough volume of air to give a positive pressure behind the suds formed. The openings (*E*) will have to be adjusted so that the volume of air escaping through the various jets approximates that which is desired. For this purpose and for the purposes of cleaning, a sliding opening is usually incorporated on the top of the sudser.

The amount of material leaving the sudser can be regulated either by changing the liquid level (*L*) or by varying the volume of air entering the line (*D*). Though soap is the material most often used in this set-up, any workable combination of cleaning and sudsing agents can be used.

Although the above sudser method has been described in terms of a citrus washer, its application can be extended to the washing of other types of fruits and vegetables, as well as to the wide application, for any purposes, of small quantities of any types of liquids which will develop suds when blown with air.

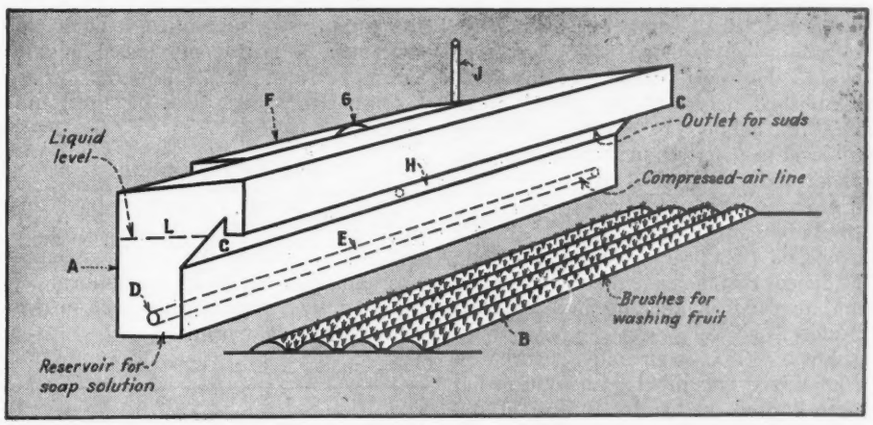


Diagram of a compressed-air soap-sudser which economically applies a cleaning agent to revolving brushes for removing dirt from citrus fruit and other products.

Physical and Chemical Changes In Cucumber Fermentation*

By IVAN D. JONES, North Carolina Agricultural Experiment Station, Raleigh, N. C. and JOHN L. ETCHELLS, Bureau of Agricultural Chemistry and Engineering, Raleigh, N. C.

This and a later article review information accumulated through research and practical observation relative to chemical, physical and bacteriological changes during production of salt stock and dill pickles. Part of the information represents conclusions drawn from small-scale commercial project

THE brine fermentation of cucumbers in the commercial production of pickles is a practice which is old and well established and one which is common throughout the civilized world. However, in spite of the well-established nature of the general practice, the details vary greatly according to localities and individual companies concerned. There is not even uniformity in the procedure followed by companies in a given locality. The existence of these variations is strong evidence that many unknown factors are involved in this method of food preservation.

Since 1935, cooperative work on commercial cucumber fermentation has been carried on by the Bureau of Agricultural Chemistry and Engineering of the U. S. Department of Agriculture and the Department of Horticulture of the North Carolina Agricultural Experiment Station. The summer investigations were at one of the large pickling plants in eastern North Carolina and lasted from about the middle of June until the last part of August.

This work was undertaken because it was felt that if the nature of the changes which occur during curing were known, a fundamentally sound salting procedure could be devised. The observations to be reported at this time were made chiefly on cucumber fermentations carried on in vats of 85-bu. capacity, salted under outside conditions.

In salting cucumbers for dill pickles or for salt stock, the chemical and physical changes are similar, but may vary in total magnitude, depending on the product to be formed. Their extent may be greatly influenced by the salting treatment followed. The changes which take place in curing dill pickles are typical.

Dill Fermentation

Freshly picked cucumbers have approximately the composition shown by Table I. Definite differences in composition exist between cucumbers of different size, representing fruit in different stages of maturity.

When cucumbers are placed in brine they undergo rapid physical and chemical changes. There is a vigorous withdrawal of water from the cucumbers and, therefore, a decided shrinkage of the fruit as well as a great dilution of the brine. Evidence of this change may be obtained by various methods. Brine-strength changes, which may be readily followed by means of a salometer, indicate that the greatest dilution occurs during the first 48 hours of the curing process.

The brine also causes the cells of the cucumber tissue to become permeable. This disorganization of the tissue permits the diffusion of soluble cellular constituents such as sugar and other organic substances from the cucumbers into the brine, and of salt from the brine into the cucumbers.

During the first 48 hours of the salting process the brine causes a marked initial loss in weight of the fruit, due to loss of water and soluble substances. Following this, there is a slower but prolonged gain in weight

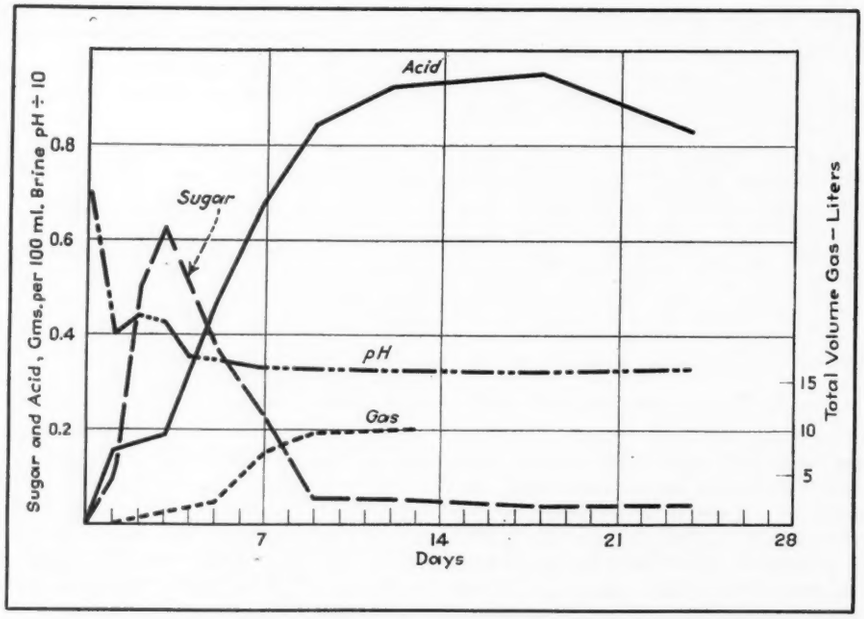


FIG. 1. Relationship of changes in titratable brine acidity, brine sugar concentration and gas evolution from brine surface for a typical dill fermentation. Acidity calculated as lactic acid, sugar concentration as reducing sugar.

*Presented at Technical School for Pickle and Kraut Packers, East Lansing, Mich., February, 1942; approved for publication as paper No. 144 of the Journal series of North Carolina Agricultural Experiment Station, Agricultural Chemical Research Division, No. 80.

due primarily to penetration of salt into the cucumbers. Part of the gain in weight results from reabsorption of water, thereby overcoming a portion of the shrinkage at first encountered.

Shortly after the semipermeability of the cucumber tissue has been destroyed and sugar has diffused into the brine, microorganisms on the surfaces of the cucumbers start an active fermentation. The nature of this fermentation will be discussed in detail in the second paper of this series, but the following facts are important to us at this time.

The microorganisms utilize the sugar and perhaps other organic substances which have passed from the cucumbers into the brine. Consequently, these organic substances disappear or are reduced to a very low level as the fermentation proceeds. Through the activity of the microorganisms many end-products are formed, including gases, organic acids, alcohols and other compounds, some of which may be formed in small quantities.

An example of relative changes which occur in a cucumber fermentation is presented by Fig. 1. The curves indicate changes in brine-sugar concentration, brine acidity and gas evolution in a representative dill fermentation. Brine sugar is expressed as grams of reducing sugar per 100 ml. of brine. The concentration of sugar in the brine increases rapidly for the first few days and then it decreases again at a rapid rate until it attains a very low level.

The diffusion of sugar from the cucumbers into the brine begins immediately after the cucumbers are salted, and continues for a longer period than may be suggested by the curve. The decrease in brine-sugar concentration is the result of the activity of microorganisms. The time at which this decrease begins and the speed with which the sugar disappears give evidence of the activity of the organisms.

Acid was determined by titration, and is expressed as lactic acid. Figure 1 indicates that the formation of acid begins very soon after the cucumbers have been brined and continues at a rapid rate for the first 10 to 12 days.

TABLE I—Moisture and Sugar Content of Recently Harvested Cucumbers of Different Sizes

Cucumber size	Water as % fresh wt.	Reducing sugar as % fresh wt.	Nonsugar solids as % fresh wt.
Small 3000's*	94.0	1.87	4.10
Medium 1200's*	94.9	2.17	2.91
Large 800's*	95.1	2.24	2.69

* Count per 45-gal. cask.

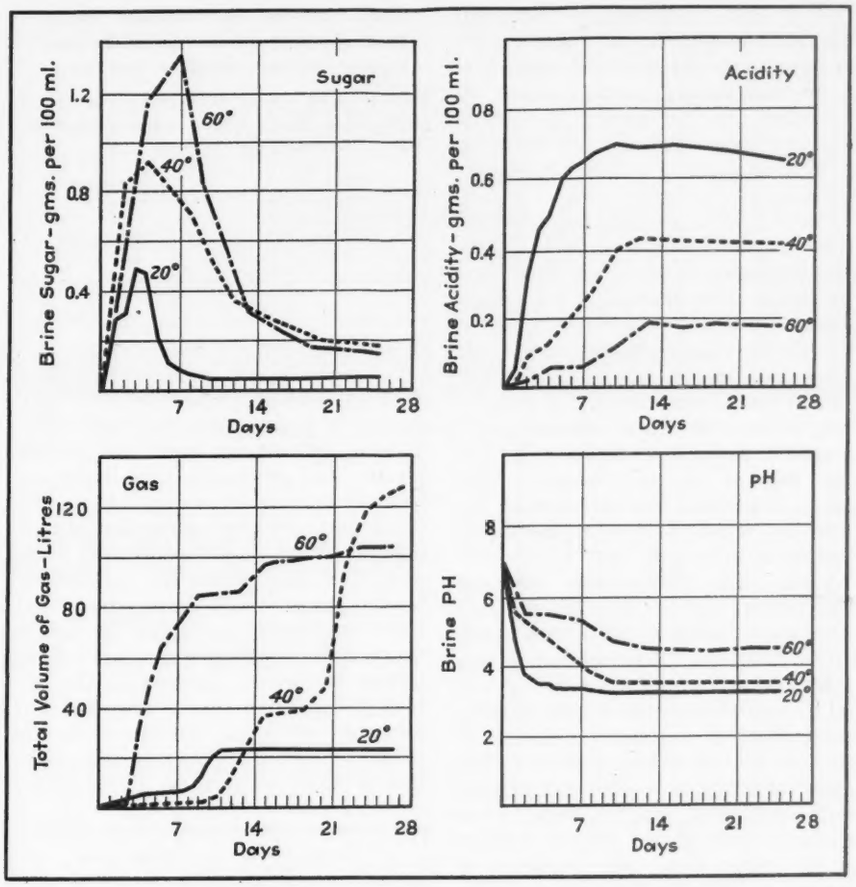


FIG. 2. Influence of brine salinity on changes during curing in sugar content, titratable acidity of the brine, pH and gas evolution from the brine surface. Acidity calculated as lactic acid.

Coincident with the formation of acid there is a corresponding change in hydrogen ion concentration or pH, as is also indicated by this figure.

The fourth curve of Fig. 1 shows the total gas evolved at different times during the period of active fermentation. This gas evolution was slow for the first 5 days, then proceeded at a much faster rate for the next 4 days, and ceased abruptly on about the ninth day.

In these studies all vats were of the same size, filled with the same volume of cucumbers and brine. Therefore the results obtained are entirely comparable throughout. The vats were 6 ft. in diameter, filled with a mass of cucumbers and brine to a depth of 4½ ft. Gas was collected by means of a stainless steel funnel 14 in. in diameter placed immediately under the head of each vat.

In the production of salt stock the general trends are the same as those in Fig. 1. However, the salting schedules followed by different individuals or companies vary greatly.

As part of our research program we studied the influence of initially different brine concentrations on the fermentations. The general salting schedule followed in these experiments is shown in Table II.

TABLE II—Schedule of Treatments Followed in Salinity Studies.

Treatment designation	Brine concentration first week (deg. sal.)	Rate of increase of brine concentration
20 deg.	20	Up 10 deg. per week to 60 deg.
40 deg.	40	Up 5 deg. per week to 60 deg.
60 deg.	60	Hold at 60 deg.

The importance of the differences induced by unlike salting treatment is shown by comparison of the degree of change or the time at which changes occur.

A series of curves shown in Fig. 2 indicate the comparative changes in brine-sugar concentration, titratable brine acidity, brine pH and volume of gas evolved in fermentations occurring with the three experimental salting treatments.

From these curves it is seen that the time at which a decrease in sugar concentration sets in and the time at which maximum brine sugar concentration is

*Percent saturation with respect to sodium chloride.

attained are progressively retarded with increasingly higher initial salt concentrations. Stated differently, the use of increasingly stronger brine at the outset of the salting procedure causes an increasingly greater delay in the development or activity of microorganisms in the brine.

This is further strongly indicated by the development of brine acidity in lots salted according to the three schedules. The curves show that if, at the beginning of the salting procedure, brines of increasingly greater salinity are used, during the fermentation period there will be two effects; namely, a progressively slower rate of acid formation and a marked progressive decrease in the total amount of acid formed. The change in the acid concentration of the brine is reflected by corresponding changes in brine pH.

Again, the relationship between brine salinity and the activity of microorganisms is brought out by the curves which show the total volume of gas evolved from the surface of brines. It will be seen that for the 40- and 60-deg. brines there is a break or change of direction in the middle portion of the gas-evolution curves. This is explained by the fact that each of these curves represents at least two gaseous fermentations rather than one. Analysis of the gas at intervals during the period of evolution indicated that hydrogen was present in relatively large proportions (35 to 50 percent) during the fermentation represented by the first part of each curve. The gas evolved during the active period of the second fermentation consisted almost entirely of carbon dioxide.

To facilitate comparison graphs showing changes in sugar content, acid content and gas evolution are grouped together in Fig. 3. This figure is divided into three portions which show changes that occur in 20-, 40- and 60-deg. brines, respectively. Two principal facts are brought out. The first is that with the 20-deg. treatment the brine-sugar concentration had been reduced to a very low level before the maximum acidity was attained and also before the very limited gaseous fermentation got under way. This is in contrast to the conditions which existed in the 40- and 60-deg. brines. The second fact emphasized by Fig. 3 is that the gaseous fermentation in the 40- and 60-deg. brines was responsible for the utilization of an appreciable portion of the sugar found in the brine. This is particularly true in the case of the 60-deg. brine, where the formation of acid was especially slow and of small magnitude.

So far there has been no mention of the microorganisms which utilize the sugar that diffuses from the cucumbers into the brine and which are responsible for the formation of acid and gas. It may be well to state that lactic acid-forming bacteria are largely responsible for the acid produced, that hydrogen-forming bacteria are responsible for the major portion of the gas produced during the period when hydrogen is liberated, and that yeasts are responsible for the gas produced during the period when appreciable quantities of carbon dioxide only are formed. For all three salting treatments considered, the period of formation of the acid and gaseous end products coincides with the period when an appreciable concentration of sugar was present in the brine.

TABLE III—Relation Between Salting Treatment and Percentage of Bloaters Formed During Curing of Salt Stock.

Values given represent averages based on observations made over a 4-year period involving 28 vats.

Salting treatment	Bloaters formed (percent)
20 deg.	6.5
40 deg.	22.9
60 deg.	43.6

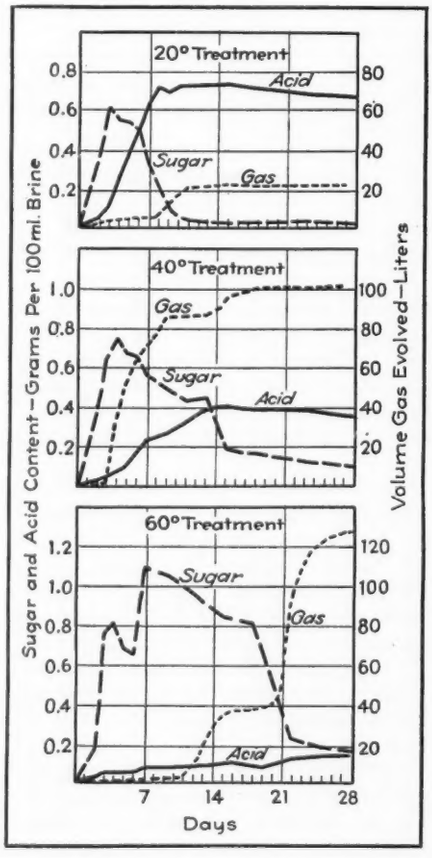


FIG. 3. Changes in brines from experimental lots salted at 20, 40 and 60 deg. sal. initial salt concentration. These results represent a single experiment during curing.

Bloater Formation

The discussion thus far has dealt largely with chemical changes during the brining procedure. Certain physical changes that also occur in the cucumbers at this time should not be overlooked. Reference has already been made to the early shrinkage of the cucumbers caused by immersion of the fresh fruit in brine. It has been indicated that a recovery from this severe shrinkage slowly takes place as the salt stock remains in the brine over a long period of time. There is frequently, however, one physical change from which there is no recovery. That is bloater formation. In salt-stock production, that portion which becomes bloaters can no longer be considered highest quality stock.

Much evidence has been accumulated on factors contributing to bloater formation. It has been shown that in salt-stock production the proportion of bloaters formed among the larger sizes of cucumbers gradually becomes larger as brines of increasing strength are employed at the outset of the salting process. This relationship is indicated in Table III. Also, gas evolution from the brine surface has been shown to be much greater from lots started at high salinity than in lots started at low salinity.

Furthermore, the disruption and deformity of the tissue comprising the seed mass of the cucumber strongly suggests gas pressure as the cause. Therefore, we conclude from our research results obtained to date that bloater formation in cucumbers is associated with vigorous gaseous fermentations.

Summary

To summarize, the use of brines of relatively low salinity during the first days (1 to 5) of the curing process will favor rapid acid formation and the production of a comparatively large quantity of acid with only relatively small quantities of gas. On the other hand, the use of brines of high salinity will retard the rate of acid formation, drastically reduce the amount of acid produced, and favor a vigorous gaseous fermentation. In addition, the use of brines of high salinity will favor the production of a comparatively large proportion of bloaters.

Acknowledgment

The authors wish to express appreciation to Chas. F. Cates and Sons, Inc., of Faison, N. C., and The Mount Olive Pickle Co., Mount Olive, N. C., for active cooperation in the studies reported.

Typical Tilsiter texture is represented in these samples of rapidly curing cheeses.

War Demands Call for Quick-Curing Cheese

By J. C. MARQUARDT
New York State Agricultural Experiment Station, Geneva, N. Y.

More cheese can be produced in a given time with the same plant capacity if quick-curing types are made. Besides, rapidly cured cheese is becoming more popular. How these types are made was studied by the author when in Europe a few years ago. Here he gives you the benefit of his knowledge

CURRENT trends in consumer tastes and the wartime necessity for speeding food processing are two factors giving increased importance to cheeses of the quick-curing types.

In respect to consumer tastes, there is a growing demand for mellow, soft, high-moisture cheeses of the rapid-curing types. For certain purposes, especially as an accompainment to beverages, these mild, clean-flavored cheeses are desired. And these products, incidentally, are readily digested.

Most consumers prefer varieties that do not have a strong odor. Tilsiter and Hollander cheeses are of this type. How these are made will be discussed, along with a method of curing Cheddar cheese rapidly, and some suggestions will be given about cheese spreads.

Tilsiter Group

These types represent cheeses that cure rapidly, have good cheese flavor and are relatively free from odor. Tilsiter cheeses can be made into any styles commonly used for Cheddar. A cheese that weighs 18 lb. or less is preferred. Three-pound cheeses are possible, but with the most experienced, a cheese weighing in the 8- to 19-lb. range is desired.

Tilsiter cheese is made from raw or pasteurized milk. Three kinds are made from milk standardized to 1.0, 1.8 and 3.0 percent of fat. The milk is set at 91.5 deg. Culture is added at the rate of 1 percent with pasteurized milk; raw milk requires only ¼ percent of culture. The curd is ready to be cut after 30 minutes.

The 1.0 percent milk cheese curd is heated to 98.5 deg. F. and held for 1½ hours. The 1.8 percent milk cheese curd is heated to 102 deg. F., and held for 1¾ hours, and the 3 percent milk cheese curd is heated to 106 deg. F. and held for 2 hours. These procedures are basic for these types.

The curd is salted at the rate of 2½ lb. per 1,000 lb. of milk. The cheese is molded without bandage, and it is rubbed with salt at 12-, 24- and 36-hour intervals. After curing at 60 deg. F. for 2 months, the cheese is ready for sale. During curing, which is done in a saturated atmosphere, the cheeses are washed twice weekly with clear water. The cheese is not paraffined.

This product has a mild Trappist cheese flavor, and the texture is open, owing to the low acid and high moisture contents. The cheese should contain 40 percent of moisture.

Hollander Cheese

This is very comparable to Tilsiter cheese. The milk contains 2.8 percent of fat. It is set at 91.5 deg. F., cooked to 106 deg. F. and held for 1½ hours. The cheese is soaked in a 20 percent brine at 60 deg. F. for two days, and it is cured at 60 deg. F. for two months. The product contains 40 percent of moisture. In detail the cheese is quite comparable in manufacture to the high-fat Tilsiter cheese.

Wilstermarsh is a similar cheese. It is set at 86 deg. F. and heated to 91.5 deg. F. It has a moisture range from 45 to 50 percent. All of these varieties are pressed lightly.

The secret of the appeal of the above types lies in their soft texture, high moisture content, mild cheese flavor and strong salt taste.

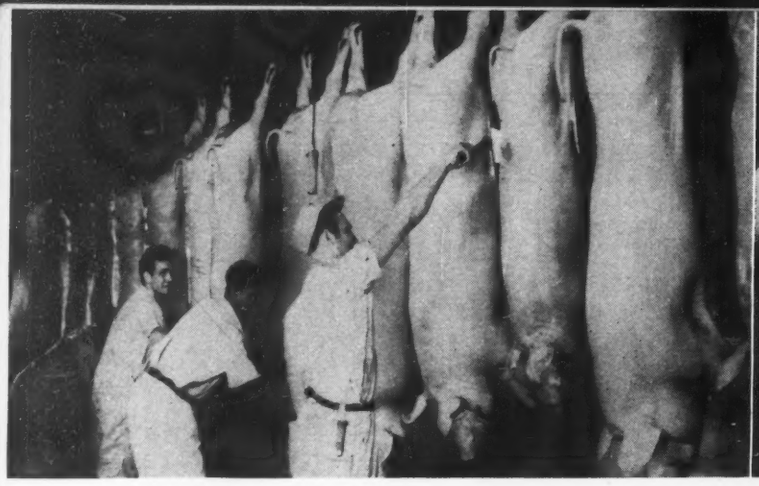
The above types of cheese can be made into spreads with 45 percent of moisture and 3 percent of salt.

Curing Cheddar Cheese Rapidly

It is not proposed herein to describe methods for making Cheddar cheese that will cure rapidly. This discussion deals with hastening Cheddar cheese curing.

Before "force curing," Cheddar cheese should be held at 40 deg. F.

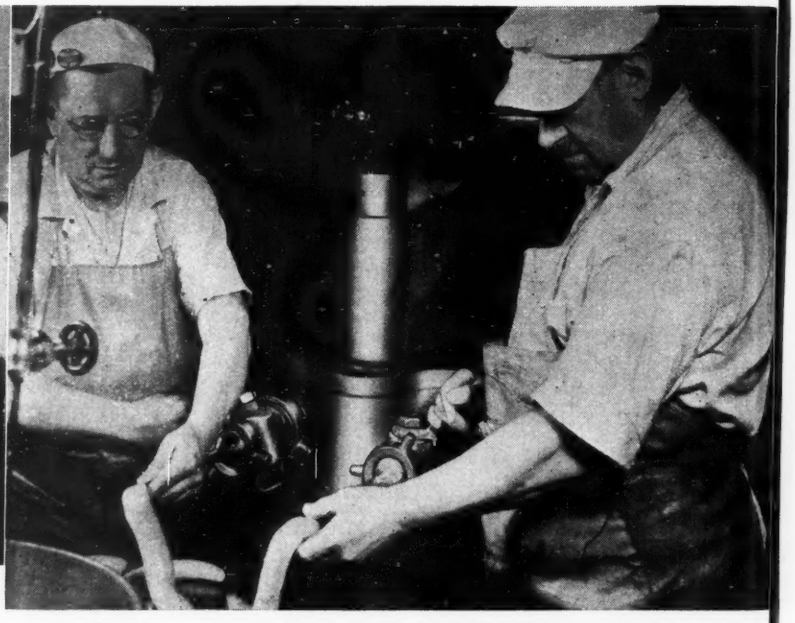
(Turn to page 104)



1. Pork for fresh and smoked sausage is from hogs slaughtered and dressed under government inspection. Overhead trolley conveyors make handling easy, fast and sanitary.

4. After grinding, the meat to be used in sausage is blended with other constituents, such as seasoning, in a tilting-type mixer. Meat put through silent cutter may need no additional mixing.

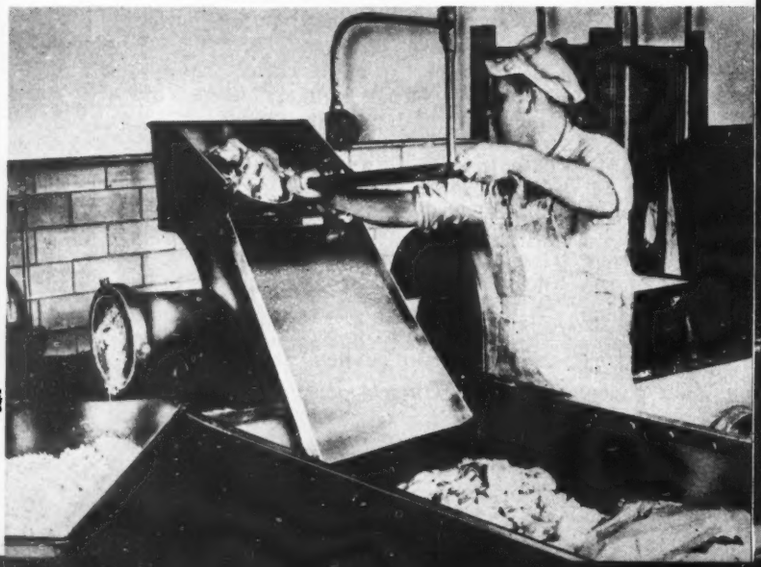
2. During cutting operations the meat is classified according to its relative portions of fat and lean and put into large portable metal tanks to be held under refrigeration while awaiting grinding.

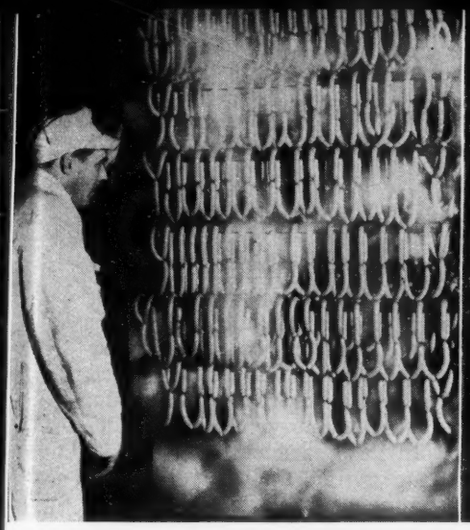


5. When mixing is complete the batch is transferred to stuffing machines which force the meat mixture under pressure through valved nozzle fittings into casing containers.

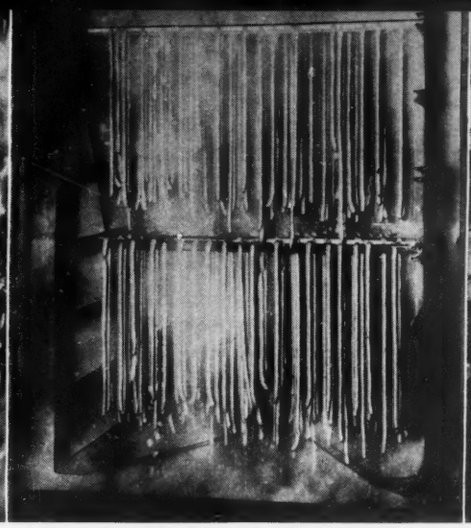
3. Each grade or type of sausage has a preferred size of meat particle, and motor-driven grinders are fitted with cutters to give the desired granulation. Grinding in this unit is sometimes followed by finer comminution in a silent cutter which has revolving knives. In the cutter, used on emulsion-type sausages such as frankfurters, crushed ice and seasoning are added to the meat, the former to keep the meat cool and to give the desired moisture content.

6. Sausage-stuffed casings are manually twisted, usually by women who attain speed through dexterity, to give links of characteristic length for the various types of sausages. An adjustable link gage assures uniformity.





7. Sausages of the frankfurter style require smoking to acquire a distinctive flavor.



8. Vienna-style sausages are cooked in hot water preparatory to being cut into 2-in. lengths for canning.

9. Sausages of the loaf style are baked in reel-type ovens with a closable front under precision time and temperature control.

Pictures of Processes

Sausage making involves technology as well as technic. It is more than grinding meat, adding seasoning and processing by rule of thumb. Quality is not left to chance and judgment. It is scientifically planned and technologically executed. The pictures show sausage making as done by Armour & Co. They illustrate a dozen different unit operations and processes, proved and perfected by decades of plant practice. Routine to meat packers, some may be new ideas to other food manufacturers.

Photos courtesy of ARMOUR & CO., Chicago.

10. Sausages get their distinctiveness as much from the condiments and seasoning as from the meat and methods of processing. Seasonings are prepared and weighed into batch lots in a central department to assure uniformity and to eliminate waste.

11. Traditional casing containers for sausages are the intestines of sheep, hogs and cattle after they have been thoroughly cleaned, chemically sterilized and cured in salt to give them strength as well as resilience. For large sausages, casings are slit and sewed like cloth.

12. Sausages of the fresh, linked style are kept continuously under refrigeration and packed into grease-resisting, lined, folding cartons for marketing through retail stores. Packaging operations in Armour plant are shown here.

Grocery Trailers Cut Store Delivery Costs

Heavier loads and greater trailer loading flexibility reduce cost of delivery from warehouse to retail store. Savings important to war effort effected

A SWITCH from conventional two-axle trucks to heavier tractor-trailer units by the Colonial Stores, Inc., has been principally responsible for a reduction in the cost of food delivery between its warehouses and retail stores of from 2.64 percent of net sales in 1936 to 1.35 percent in 1941.

While this remarkable achievement has been due in part to other automotive economies, the change from 3½-ton regular trucks carrying loads of 10,000 lb. each to tractor-trailers hauling loads of 20,000 lb. per unit has been the greatest single factor contributing to the reduced haulage expense.

The Colonial Stores, Inc., which is a combination of the Rogers Stores, the Pender Stores, the Little Star Food Stores and the Big Star Super-Markets, operates a total of 517 chain stores and super-markets, principally in the states of Virginia, Georgia and North and South Carolina. Its main offices are in Norfolk, Va., and its warehousing and transportation operations are under the supervision of E. M. Fetherston, Jr. A central, completely equipped warehouse in North Carolina shortens many long hauls.

In the Colonial Stores operations key warehouses are set up in eight principal large cities: Richmond and Norfolk, Va.; Durham, N. C.; Greenville and Charleston, S. C.; Atlanta, Savannah and Thomasville, Ga. Each of these centralized warehouses serves as a source of supply of a complete line of groceries, vegetables and other food products, including fresh bread, to certain of the chain stores or super-markets located within a trucking radius of between 50 and 75 miles, depending upon the location of other smaller cities within the sales area.

The Problem

The automotive problem is to transport the various food items from the key warehouses to the retail-store outlets at sufficient frequency to keep the stores always adequately stocked and to do this work at a minimum of expense.

Prior to 1936, the Colonial company used large 3½-ton rated trucks carrying 10,000-lb. payloads for the delivery of its merchandise from its warehouses to its retail stores. It also used smaller trucks of ½- to 1½-ton ratings, principally Chevrolets, with some Fords, for making deliveries direct to the consumer from the retail stores. One and one-half ton trucks were used to deliver fresh bread from its bakeries to the retail stores.

Then as the company enlarged its sales territory to increase its total volume through a larger number of retail outlets, the relatively slow speed of the 3½-ton trucks and the relatively small loads carried made necessary either the purchase of a larger number of such trucks or a change to 5-ton trucks capable of carrying loads up to 16,000 lb. On such trucks, two men, a helper along with the driver, would have been required in order to get the vehicle back to its warehouse within the limits of the working day.

Also, with such higher capacity trucks, the question of the loading factor would have arisen, since, except for night loading, the ratio of loading time to running time would have increased because it is impossible both to load and run a conventional truck at the same time.

After considerable study of the territory and the loading facilities at the various warehouses, with consideration also given to the more or less general increase in the cost of both vehicles and warehouse labor, it was decided to try out 2½- to 3½-ton tractors with trailers able to carry 20,000-lb. loads.

Retained Light Equipment

This decision retained the light motive-power equipment with its lower fuel consumption per mile as compared with the heavier straight or conventional two-axle trucks, increased the load-carrying capacity to 20,000 lb. (double that of the original 3½-ton trucks) and greatly improved the loading to running factor.

In fact, thorugh the purchase of more trailers than tractors, with one trailer loaded during daylight hours while the tractor is out delivering with another trailer, the loading factor, or the ratio of the time of loading a truck to its total working day, is reduced to zero. With the trailer loaded in advance by warehousemen, all the tractor has to do is to back up, connect with the trailer and be off on its route.

Under such a scheme of operation, the only nonmoving time of the tractor-trailer combination is the time of unloading at the successive retail stores and the time of unloading any returns at the warehouse at the end of the trip.

As a result of the economies secured with the first tractor-trailer combination put into service, all Colonial warehouse and bakery deliveries to stores and super-markets are now made on tractor-trailer units.

To illustrate the savings which can be effected, the company in October, 1941, changed over its bakery operations from the small trucks to the tractor-trailer setup. Prior to that time, the company used seven small trucks and seven drivers, each making two trips a day to the stores served. Now two tractor-trailers with four men (a saving of three men), do the same work by making only one trip a day to each store.

The above change in the principle of operation resulted in a saving of vehicular mileage of 50 percent and a reduction in delivery cost of 31 percent.

Mileage Reduced

Entirely aside from the above savings made at the time of the change in equipment, and since continued, the reduction in vehicular mileage has stood the company in good stead in these days of mandatory reduction in tire mileage in order to stay in business for the duration.

While the company still retains the small ½-ton and 1½-ton trucks for retail deliveries to the consumer, a better combination of loads, an attempt to secure larger individual orders and a reduction in the frequency of deliveries has tended to reduce the vehicular mileage in this truck category and to reduce the total fleet mileage.

A saving in gasoline consumption has also been made in the switch from the original 3½-ton trucks to the tractor-trailer units in place of heavier 5-ton trucks. This also contributed to the overall reduction of from 2.64 percent to 1.35 percent for delivery expense in 1936 as compared with 1941.

This reduced fuel consumption is due in part to one of the fundamental

factors of automotive transportation, namely, that a vehicle can pull more than it can carry.

The use of trailers offers greater flexibility in serving the retail stores. For example, if two stores on the same route each required 10,000 lb. of groceries on a given day, both orders could be delivered by trailer on the same trip at a minimum of road mileage.

If 10,000-lb. trucks were used, two such trucks would be required with almost double the mileage of the trailer. If 5-ton trucks carrying 16,000 lb. were used, the order for one store would have to be cut 4,000 lb. or each store cut 2,000 lb.; or a second truck would have to be sent out with 4,000 lb. or 12,000 added to its load for a third store in order to obtain full efficiency of operation. The company's 73 super-markets take several 20,000-lb. loads.

The use of trailers also makes possible certain economies in the maintenance of the fleet. With more trailers than tractors, body repairs and repainting of the trailers may be done without taking the tractors out of service. This cannot be done with a conventional truck.

Because of the possibility of painting and repairing the trailers separately and individually, the tractors can be kept in service a larger number of days in the year. This is another wartime advantage now when it is impossible to buy new automotive equipment without A-1 priorities.

Results Very Satisfactory

Altogether, the switch from trucks to tractor-trailer equipment prior to the declaration of war has given the Colonial company a most satisfactory reduction in transportation expense, the aim of all traffic or automotive departments. At the same time, these savings have included both fuel and tires, the two commodities which the Office of Defense Transportation has sought to conserve to permit the continued operation of our civilian automotive equipment until the war is won.

As to the tractor-trailer equipment itself, one of the newest combinations is shown in the illustration on this page. It consists of a light Mack tractor and a Fruehauf trailer. The tractor is equipped with a Diamondette deck plate and bolster gas tanks on each side to increase the fuel capacity.

The trailer is one of the Fruehauf standardized designs and is equipped with a hand-operated landing gear to enable it to be parked backed up to the warehouse loading platform while the tractor is out on the route delivering a load of foods in another trailer.

The basic paint color of both tractor and trailer is a deep, rich maroon. The tractor lettering is conventional in that it carries on each cab door, the name of the Colonial Stores, Inc. and in addition, the company's sales slogan, "Everything that's good to eat."

The lettering of the trailer, however, is quite unusual as may be seen from the accompanying illustration. Lengthwise, the trailer surface at the front and for about one-third the way back from the trailer front or nose is divided into four horizontal strips by means of three equally spaced light-colored mouldings.

In each of these horizontal strips, the names of one of the units in the Colonial organization is given, including the Rogers Stores, the Pender Stores, the Little Star Food Stores and the Big Star Super-Markets.

Back of the above store designations on a light background is painted the company name; a repeat of the sales slogan, "Everything that's good to eat"; and below at the bottom of the trailer side, a hand-painted group of vegetables in natural color. The rear doors carry reproductions of the Colonial coffee-packages. This lettering with a light-colored trailer roof, gives a layout of exceptionally good sales appeal.

One of the tractor-trailer combinations in the Colonial Stores, Inc., fleet. Principally through a switch from 3½-ton trucks to tractors and trailers each carrying 20,000-lb. loads as compared with 10,000-lb. loads on the 3½-ton trucks, the Colonial company has reduced the cost of its transportation of groceries from warehouses to retail stores from 2.64 percent of net sales in 1936 to 1.35 percent in 1941. The unit shown consists of a Mack light tractor and a Fruehauf trailer. The basic paint color of both tractor and trailer is a deep, rich maroon. The trailer lettering layout has an exceptionally good sales appeal.

Brief Summaries Of Grade Standards

For the convenience of those who control quality in the food industries the following digests have been prepared of standards issued by the Agricultural Marketing Administration

ABSTRACTS containing the principal requirements of the standards issued by the Agricultural Marketing Administration of the Department of Agriculture are prepared by FOOD INDUSTRIES. Those that follow and those which appeared in the August, September, October and November, 1941, and July, August, September, October, November and December, 1942, issues are a continuation of the series begun in 1940.

The complete text of the standards can be obtained from the Agricultural Marketing Administration, located in Washington, D. C.

Frozen Red Raspberries

FROZEN RED RASPBERRIES are prepared from the properly ripened fresh fruit of the red raspberry plant, are stemmed and cleaned; are packed with or without sugar or sirup; and are frozen and stored at temperatures necessary for the preservation of the product.

U. S. GRADE A or U. S. FANCY frozen red raspberries are red raspberries of similar varietal characteristics which possess a practically uniform characteristic red color; are practically free from defects; are mature, well developed, and practically intact; possess a normal flavor and odor; and score not less than 85 points.

U. S. GRADE B or U. S. CHOICE frozen red raspberries are red raspberries of similar varietal characteristics which possess a characteristic red color; are fairly free from defects; are reasonably mature, well developed, and intact; possess a normal flavor and odor; and score not less than 70 points.

OFF-GRADE frozen red raspberries are red raspberries that fail to meet the requirements of U. S. GRADE B or U. S. CHOICE.

Frozen red raspberries are sometimes packed with added sugar in a definite ratio and such packs are designated by the pounds of fruit packed for each pound of sugar for example, "4+1 pack" means that at the time of packing 1 lb. of sugar is added to 4 lb. of red raspberries. Federal inspection certificates will indicate the ratio of sugar when the amount of sugar used can be determined at the time of packing. If the red raspberries have been packed without added sugar or sirup, inspection certificate will state "Packed without sugar." If red raspberries are packed with sirup as a packing medium, the density of the sirup at the time of packing will be indicated on the inspection certificate when it can be determined.

The grade of frozen red raspberries may be ascertained by considering, in addition to the foregoing requirements, the following quality factors: Color, absence of defects, and character of fruit.

Color—If the red raspberries are packed in sugar or sirup, the color is compared after washing the red raspberries. A representative sub-sample of the thawed red raspberries, drained of sirup, is placed in a suitable container; two parts of water to one of fruit are added and the mixture is stirred slightly to wash the berries. The water is then drained off and the rating for the factor of color is determined immediately.

To receive a score of 34 to 40 points the red raspberries must possess a practically uniform characteristic red color, with as much or more red than Plate 3-K-4,[1] but not grey nor darkened by oxidation or overmaturity.

If the red raspberries possess a characteristic red color, a score of 28 to 33 points may be given. The red color may be variable, but may not be excessively grey nor light in hue, nor excessively darkened by oxidation or over-maturity. Red raspberries that fall into this classification shall not be graded above U. S. GRADE B or U. S. CHOICE.

If the color of the red raspberries is decidedly irregular in color or decidedly off color, a score of 0 to 27 points may be given. Red raspberries that fall into this classification shall not be graded above OFF-GRADE.

Absence of Defects—The factor of absence of defects refers to the degree of freedom from red raspberries damaged by discoloration or damaged by insect, mechanical, pathological, or other injury; and from harmless extraneous vegetable material, such as, leaves, stems, and caps. "Damage by discoloration" means any surface blemish having an aggregate area exceeding that of a circle ¼ in. in diameter or any noticeable blemish that extends into the fruit tissue.

To receive a rating of 34 to 40 points, the red raspberries must be practically free from defects, with no harmless extraneous vegetable material present and not more than 5 percent by count of the red raspberries may be damaged.

If the red raspberries are fairly free from defects, a score of 28 to 33 points may be given; not more than one piece of harmless extraneous vegetable material for each 16 oz. of net contents may be present and not more than 10 percent by count of red raspberries may be damaged. Frozen red raspberries that fall into this classification shall not be graded above U. S. GRADE B or U. S. CHOICE.

If the defects are decidedly prominent so as to affect seriously the appearance of the product or if the frozen red raspberries fail to meet the requirements of the paragraph above, a score of 0 to 27 points shall be given. Frozen red raspberries that fall into this classification shall not be graded above OFF-GRADE.

Character of Fruit—To receive a score of 17 to 20 points the red raspberries must be mature, well developed and practically intact, ripe, but not overripe, fleshy and tender with not more than 5 percent by count of the berries crumbled or crushed and with the berries and any accompanying liquor practically free from detached seed cells.

If the red raspberries are reasonably mature, well developed, and intact, a score of 14 to 16 points may be given; if the berries are not more than slightly immature nor slightly overmature, nor more than slightly lacking in fleshy texture, with not more than 15 percent by count of the berries crumbled or crushed, and with the berries and any accompanying liquor reasonably free from detached seed cells. Frozen red raspberries that fall within this classification shall not be graded above U. S. GRADE B or U. S. CHOICE.

Frozen red raspberries that fail to meet the requirements of the paragraph above may be given a score of 0 to 13 points and shall not be graded above OFF-GRADE.

The grade will be determined by averaging the score of all containers, provided not more than one-sixth of the containers fail in some respect to meet the requirements of the grade indicated by the average score. However, none of the containers may fall more than 4 points below the minimum score for the grade indicated by the average score.

ISSUED: July 31, 1942
EFFECTIVE: September 1, 1942

Frozen Spinach
(Tentative)

FROZEN SPINACH is prepared from the succulent leaves of fresh spinach by sorting, trimming, washing and precooking, and is frozen and stored at temperatures necessary for preservation of the product.

U. S. GRADE A or U. S. FANCY frozen spinach possesses a practically uniform typical green color, is practically free from excessive leaf stems, possesses a good texture, normal flavor and odor, and scores not less than 85 points.

U. S. GRADE B or U. S. EXTRA STAND-

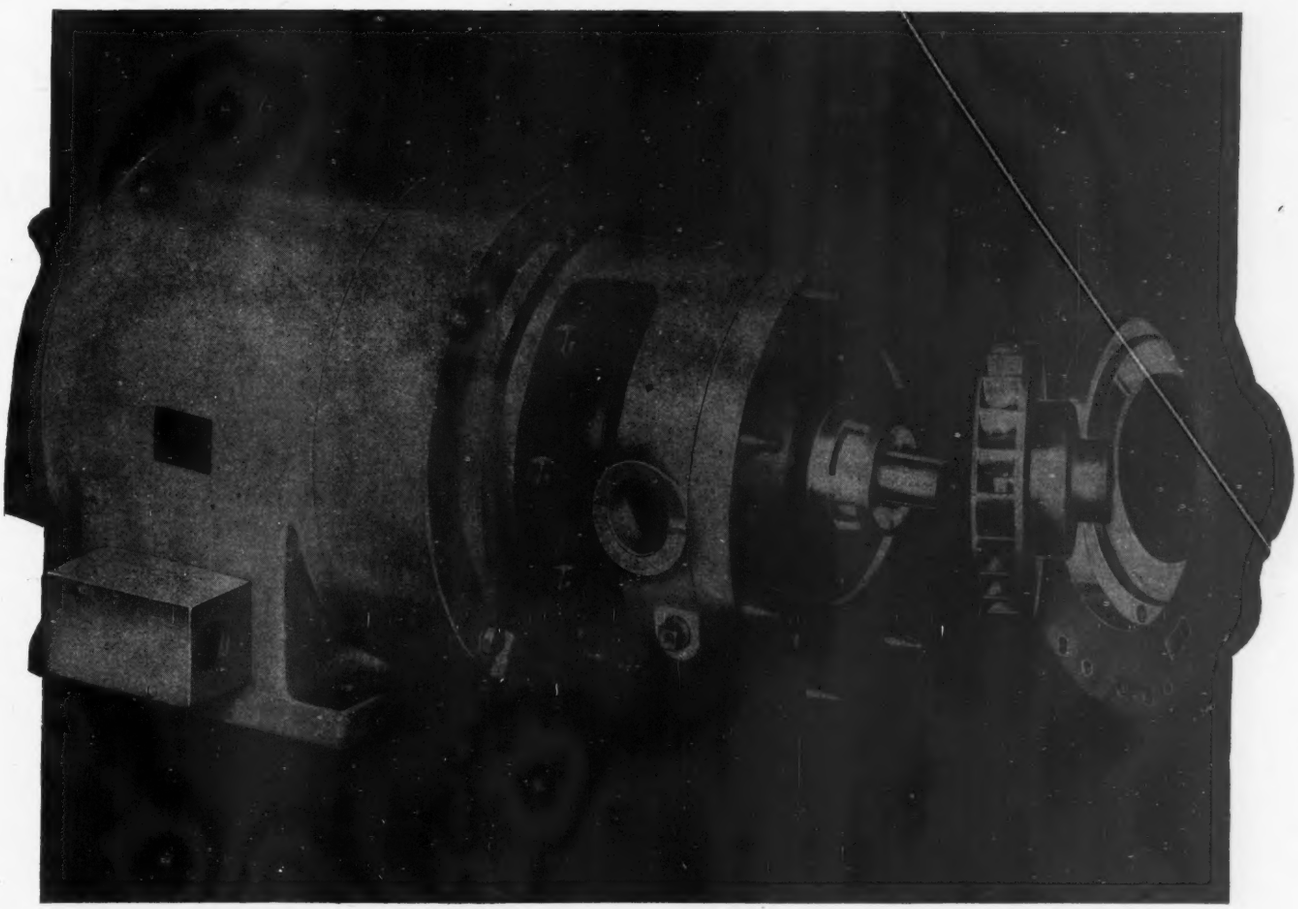
(Turn to page 111)

[1] Maerz and Paul's "Dictionary of Color".

NASH CLEAN-AIR COMPRESSORS

(TRADE MARK REG.)

are Long Life compressors, because they have no internal wearing parts



The Nash Clean-Air Compressor has but one moving part, cast in one piece and rotating in the pump casing without metallic contact. No internal lubrication is necessary; therefore air or other gas compressed with a Nash is entirely free from oil contamination.

Dust and heat are removed from the air, or gas compressed, by the unique Nash "Liquid Piston". Air from a Nash Compressor is therefore delivered free from dust, heat, or oil, without supplementary filters or air washers, in a perfected mechanical structure with no internal wearing parts.

Air or gas from a Nash Compressor may be used for agitating, blending, maintaining pressure on storage tanks, or moving liquids and materials by pressure displacement, in connection with the most delicate food, beverage, or chemical process, without danger of contamination.

Bulletin D-252 tells all about Nash Clean-Air Compressors, and it is free on request.

THE NASH ENGINEERING COMPANY

220 WILSON ROAD, SOUTH NORWALK, CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS

Cheese in Stoneware

CHEESE in a crock is not news, but Swiss cheese with sauterne wine added, in an 8-oz. earthenware container, is a novelty on the New York market. The "Red Rooster" cheese, processed by Red Rooster Foods, Chicago, Ill., is sealed with paraffine, then covered with a laminated wax paper and foil disk. The reuse container is in pastel colors with the red rooster trademark. Its lid is held in place with a wire which runs through a groove in the handle.

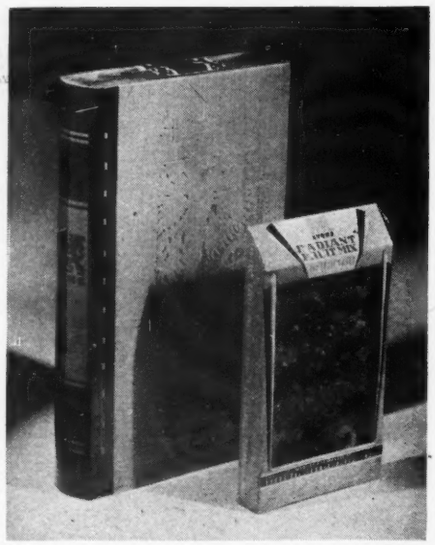
Made in America

HONEY butter was at one time a delicacy imported from England for the carriage trade. However, New Yorkers are now reacquainting themselves with the product, developed in America by E. A. Dreher, Jr., Newark, N. J. The honey is paddled or whipped until the moisture is removed and it takes on a creamy white color with butter-like consistency.

"Sun Valley Farms" honey butter is said to be 100 percent pure; it is packed in a 1-lb. glass container with a white enameled screw cap. The processors, who also make "Sun Valley Farms" Sauce (hollandaise type), "Lemonaise" and "Sun-Naise" (a nonfattening dressing), recommend honey butter as a spread for waffles or toast.

Glace Fruit in New Guise

CALIFORNIA glacé fruit is distributed in a variety of attractive new packages by Lyons Magnus, Inc., San Francisco. The company's "Radiant Fruit Mix," diced glacé fruit for use in fruit cakes, pastries, desserts and salads, is packed in an eye-arresting window package of red, black and yellow paperboard with the Lyons trademark and an amber cellophane overwrap. The drained candied fruit mix is made from assorted



citrus peels, melon, cherries and pineapple, prepared with sugar and citric acid.

A 2-lb. "Book of Sweets," containing candied apricots, pineapple, cherries, tangerines and other fruits, prepared with corn sirup, cane and invert sugar, is a handsome wooden "book" box with binding of brown and gold paper. A design is "etched" in the wood cover in relief, applied by a sand blasting process, and "California" is "etched" on the side of the natural Redwood box. Amber cellophane is again used as an overwrap.

Domestic Cheddar Blend

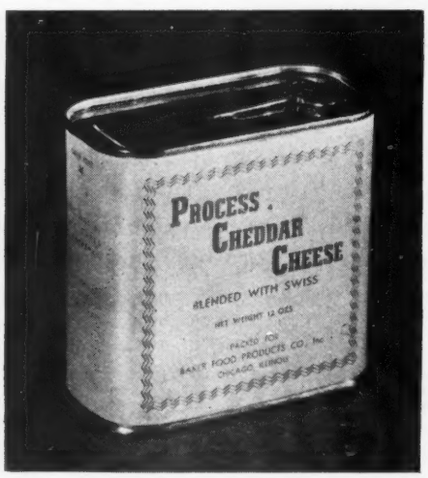
WITH imports of foreign-variety cheese sharply curtailed, many people are discovering the excellent quality of domestic cheeese, much of which is naturally ripened in the Midwestern states. A superior processed Cheddar cheese, blended with Swiss, is packed for Baker Food Products Co., Inc., Chicago, Ill. Ingredients are short held and aged American Cheddar cheese, blended with Wisconsin Swiss cheese, sodium phosphate and salt. It is packed in a 12-oz., key-opened rectangular tin.

Two for the Price of One

"BETTY CROCKER" dry soup mix containing dehydrated vegetables, is selling rapidly in metropolitan areas at the introductory offer of two packages for the price of one plus one cent for the second package.

A General Mills product, the vegetable-noodle soup mix contains egg noodles from "Gold Medal" durum flour, with niacin and thaimine added, salt, vegetable protein derivative, dehydrated fresh vegetables, paprika, tumeric and flavorings. One 2¾-oz. package makes six servings. The vegetables, in a "Thermoseal" heat-sealed glassine envelope, are packed with the noodles in a paperboard carton.

(*Turn to page 75*)



THOUGH SPECIAL PACKAGES IN WARTIME ARE DOOMED TO QUICK EXTINCTION

THE JARS WITH ARMSTRONG'S CLOSURES STILL RETAIN THEIR OLD DISTINCTION

WARTIME STANDARDIZATION doesn't mean that your glass packages have to look like all the others on the shelf. Armstrong's colorful metal caps can help solve that problem for you.

Let us put a smart, bright decoration on your closures, and keep your packages distinctive, keep your trade-mark in the public eye. Those trade-marked closures will keep working for you, not only in dealers' displays, but in the consumer's kitchen every time the package is opened and re-opened.

And, properly applied, Armstrong's Metal Caps will give your products maximum sealing protection to keep them fresh and tasty.

Write today for full information about Armstrong's complete line of quality closures, as well as Armstrong's wide variety of glass containers for foods. Remember, too — Armstrong's research workers are constantly experimenting with new closure ideas, new ways to meet current and future material restrictions. Armstrong Cork Co., Glass and Closure Div., 4201 Jackson Street, Lancaster, Pa.

ARMSTRONG'S CLOSURES

TURN STANDARD CONTAINERS INTO STAND-OUT PACKAGES

GLASS MAKING IS STILL AN ART

...when a designer like this goes to work

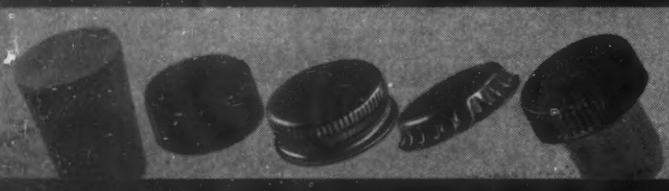
JAMES STEELMAN'S job demands a special talent for combining artistic skill with the practical approach. He is a designer, a designer who understands both the possibilities and limitations of his medium—glass.

An ordinary designer probably could not design a completely successful glass package. He would have to know too many things which are not part of his day-to-day experience.

But James Steelman knows these things. He knows how bottles are made, how they're packed and sold, what treatment they may expect in users' hands. So when he carefully plots the shape of a new package, this knowledge guides his pencil just as much as his knowledge of attractive lines. That's one reason why Armstrong's Glass is good-*acting* as well as good-looking. Because of the experience of men like James Steelman, glassmaking is still an art in Armstrong's plants just as it was in the days when all glass was made by hand.

Get the whole story of Armstrong's top-quality glassware by writing for the new free booklet, "Men and Glass." And remember that Armstrong can supply the closure you need, too, from a complete line. Armstrong Cork Company, Glass and Closure Division, 4201 Jackson Street, Lancaster, Pennsylvania. Plants at Millville, New Jersey, and Dunkirk, Indiana.

ARMSTRONG'S GLASS



and **ARMSTRONG'S CLOSURES**

Soup Mixes in Glass

WHILE some companies have been marketing dehydrated foods in glass containers, Williams, West & Witts, Chicago, Ill., has gone a step further with its "Beef Soup Mix" and "Chicken Soup Mix" packed in extremely wide-mouthed clear glass jars. The metal screw cap on the jar of beef and vegetable soup mix has a black baked enamel finish; the cap on the chicken soup mix has a bronze-color finish.

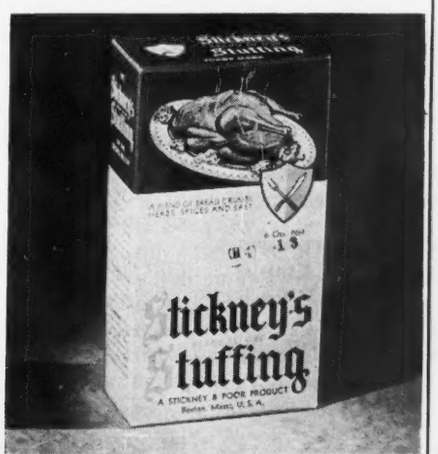
When rehydrated, the contents of either 9-oz. jar make a gallon, or 16 bowls, of soup, with good quality and flavor. The Beef Soup Mix contains beef extract, chicken fat, vegetable protein derivative (artificial seasoning), vegetable oil, barley, spices, salt and egg noodles, dextrose, dehydrated tomatoes, Bell peppers, leek, onions, celery and carrots. The Chicken Soup Mix contains chicken fat, wheat protein derivative, vegetable oil, dextrose, dehydrated carrot, celery, onion powder, spices, salt and noodles.

Coconut Cocktails

COCONUT in cocktails has been a Southern specialty for a number of years, but the introduction of "Koko Whip" in Northern markets is attracting new consumers. The coconut powder, processed by Howard Preserving Co., Miami, Fla., is a blend of coconut, pure cane sugar, milk solids, dextrose and vanillin, fortified with artificial flavoring. A recipe label on the lid of the tin for "Coconga" cocktails calls for Koko Whip, white rum, sugar and cracked ice; 60 cocktails may be made from the contents of the can.

Prepared Stuffing

While not the first company to introduce dried stuffing for meats, Stickney & Poor Spice Co., Boston, Mass., has brought out a product that merits attention. A finely ground blend of bread crumbs, herbs, spices and salts, the stuffing has unusually good flavor and is easy to prepare. It can be used in meat loaf, stuffed peppers, tomatoes, fish, shoulder of lamb or pork chops as well as in turkey and other fowl. Two cups of water added to the contents of the 6-oz. carton will make enough stuffing for one 6-lb. bird. All you need is the turkey.



SLICES?
CUBES?
STRINGS?
POWDER?

If you are interested in drying foods the Bowen Dehydration process will merit attention

The Bowen "De-Hy" using an inert gas for the drying medium will dry vegetables, meats, fish, etc. in the form of slices, cubes, strings. For drying soups, fruit juices, coffee, milk, etc. the Bowen Spray-Dryer will produce an easily controlled uniform powder.

1. LOW OXYGEN
2. NO CASE-HARDENING
3. HIGH EFFICIENCY

An interesting illustrated booklet that describes in detail the Bowen processes is available now. Fill in the coupon and mail it today for your personal copy.

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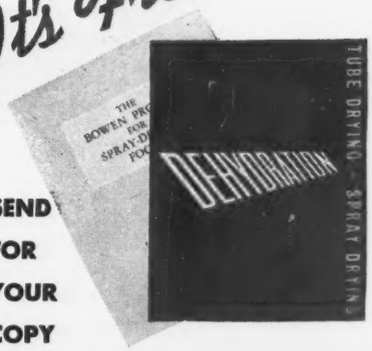

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Bowen Research Corporation

BOWEN

70 MAPLE STREET GARWOOD, N. J.

Please send me a copy of "Dehydration" without charge.

Name.....

Company.....

Street.....

City.....State.....

From unnamed ports along our coasts go shiploads of food to feed our Allies. They are not fancy cans . . . not prize examples of the lithographic art . . . but the food they contain means the difference between life and death for thousands . . . yes, *for millions* of men, women and children who fight by our side.

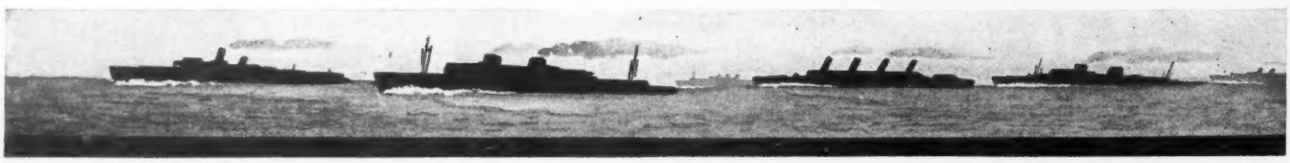
While the cans are not artistic masterpieces . . . the wording in most cases being a simple statement of the contents . . . such as "Pork and Soya Links" . . . the cans must be exceptionally sturdy. No one knows how crude may be the means of transportation that will carry them to their final destination.

Crown Can is proud that so many of the containers now rolling off its production lines are going into this branch of the national service . . . carrying the food so desperately needed by our Allies.

CROWN CAN COMPANY, PHILADELPHIA, PA.
Division of Crown Cork and Seal Company
Baltimore, New York, St. Louis, Houston, Madison, Orlando, Fort Wayne, Nebraska City

★ ★ ★ ★ ★

CROWN CAN



FOOD INDUSTRY NEWS

GENERAL NEWS • TRENDS • MEN • JOBS • COMPANIES • JANUARY, 1943

Wickard Given Broad Power As Food Administrator

In complete charge of everything from planting of seed to finished food product, except labor

A FOOD ADMINISTRATOR has been appointed. After a three-cornered struggle between Leon Henderson representing distribution, Donald Nelson representing processing and Claude Wickard representing farm production, President Roosevelt decided in favor of the Secretary of Agriculture. This action ends a behind-the-scenes battle that has been largely overshadowed by the more spectacular but no more important sparring match between the armed services and WPB for control of armament scheduling. Actually it was a two-man race, since Leon Henderson was never a serious contender and finished a poor third.

The presidential order which named Wickard placed full control of the war food program in the hands of the new administrator. Since Stabilization Director Byrnes had already transferred authority over farm wages under $2,400 per year to the Secretary of Agriculture, Mr. Wickard now is in complete charge of everything from planting the seed to the final consumption of the end product, except farm labor. But the Secretary already had a place on the Manpower Commission.

Administrator's Responsibilities

The responsibilities of the Administrator as laid down by the order include the following:

1. The determination of the food requirements for human and animal consumption for civilian, military, Lease-Lend and industrial uses.
2. Formulation of a plan to provide the necessary food and the allocation of agricultural productive resources for this purpose.
3. Assignment of food priorities and allocations of food for human and animal consumption to governmental agencies and for private account, for direct and indirect military, other governmental, civilian and foreign needs.
4. Provision for the efficient and proper distribution of the available food supply.
5. Establishment of policies and handling the purchase of food by any Federal agency within the United States.

The order further directs that the Secretary will recommend to WPB Chairman Nelson the material and equipment necessary to carry out the food program. WPB will allocate amounts of materials and equipment to the Secretary for the purposes the Secretary may determine. Nelson and Wickard together will determine the allocation of food supplies when the available quantities are insufficient for both food and industrial needs. Rationing of food for civilian use will be carried out by the Secretary through OPA. The Secretary will cooperate with other agencies concerning the production and stockpiling of food for use in foreign countries. Wickard instead of Nelson will now issue directives relating to the importation of food for human and animal consumption, and both men will act together in the case of food being imported for industrial use.

Another duty of the Administrator is to provide the Office of Defense Transportation with a schedule of food priorities for the domestic movement of food. This action is to be taken when shipping difficulties arise and is to be done after consultation with WPB. ODT will take these schedules into consideration in planning freight movements.

To Name Advisers

An advisory committee is to be appointed by the Secretary. The committee is to be composed of representatives of the State, War and Navy Departments, the Offices of Lease-Lend, BEW, WPB and any other agencies the Administrator may think necessary. The Food Requirements Committee is to be abolished when the advisory committee has been set up.

The functions of all government agencies concerned with the production and distribution of foods are to be transferred to the Department of Agriculture. Within the Department there has been set up a Food Production Administration and a Food Distribution Administration each headed by a director appointed by the Secretary.

Finally the Order provides that differences arising between the Secretary and other agencies or officials shall be submitted to the President or his designated agent for arbitration.

Thus the control of the food program was concentrated in the hands of one man.

Food Men To Cooperate

There is complete agreement among food men on the necessity to get behind the program of the new Food Administrator and make it work. This opinion has been expressed both publicly and privately inside and outside of the government circles. In the WPB Food Division, which either is to be scrapped or transferred to the Department of Agriculture by terms of the President's order, there has been no shrinking from the thought of active cooperation with any program the Secretary sets up by either the dollar-a-year top executives who will soon be back in private industry or the hired help some of whom may possibly be looking for new positions.

NEW CHIEF OF BACE

Dr. William Woolford Skinner has been appointed chief of the Bureau of Agricultural Chemistry and Engineering to fill the vacancy left by the death of Dr. Henry G. Knight last July. Born in Baltimore in 1874, Dr. Skinner has been associated with the work of the Bureau since 1904, when he became a food inspection chemist for the then Bureau of Chemistry. He has been associate chief of the Bureau since 1939.

WPB Further Restricts Use Of Tin Cans for Foods

Takes more foods out of tin. Issues new schedules for can sizes and quotas. Reserves half of pack

THE 1943 version of the tin order M-81 is out. With its companion orders M-86 and M-86-e the canning industry knows what is to be packed next season, how much is to be packed and to whom it is to be sold—the armed services and Lease-Lend or the civilian population.

In the order as it is written for the coming season the ideas behind last year's order have been continued. In both orders the use of tinplate, terneplate and black-plate for canning foods and nonfoods is limited, the can sizes for each product are specified and the packing quotas for the items covered are shown. But this year's order curtails the number of items that may be packed in metal containers still more than last year's order and goes a step further in forcing the use of larger can sizes. The use of the larger sizes permits more food to be put into cans with the same amount of tinplate. Since more of the canned products are restricted to government use than previously, the larger can sizes generally are desirable.

Schedules shown in the new M-81 are much more complete and understandable than before, and the items are broken down into three groups instead of only two. The first schedule states the amount of plate that can be used for canning foods for both government and civilian use. Table 2 limits the use of cans for foods for civilian consumption only, and Table 3 limits the use of cans for nonfood items for civilian use. Cans used to pack products listed in either schedules 2 or 3 to fill government orders are not restricted by the quotas shown.

Over Half of Pack Reserved

M-86 as amended and M-86-e increase the amount of next season's pack of fruits and vegetables that must be set aside for government use. In 1942 the canners were required to set aside only about 35 percent of the pack for that year, as against more than 50 percent of the 1942 pack that must be reserved for the government in 1943 although the amount reserved varies with different products. M-86 requires that the products shall be set aside as ordered by the Director General for Operations, and M-86-e is his order specifying the amount to be set aside.

Tin Situation Favorable

The restrictions that have been placed on the use of tin, plus the salvage operations and electro-plating evidently have achieved the desired results. The stockpile of tin has remained in fair shape. This does not mean that there is tin to spare. Far from it. Tin being an imported product, is in a very vulnerable position. But it is interesting that the supply of black plate may be tighter than tin at the moment. By that is meant that the demands for steel are relatively greater than the demands for tin. The supply of both metals is short. But since steel is supplied from domestic sources, efforts are being made to shift the demand to black plate and away from tin plate even though steel from the canners viewpoint is the scarcer metal. This does not mean that present restrictions will be relaxed. If anything, the contrary will be the case.

Shortest Haul Required

WASHINGTON plans to compel distributors of food to restrict rail movement as much as possible. Trading of customers may come ultimately despite the horror of the Department of Justice. The matter got so hot the first week in December that the new Director of Civilian Supply, Joseph Weiner, issued a denial that there was going to be any arbitrary regulation restricting shipments to 500 miles. Nevertheless, that type of regulation is confidently expected. Smart executives are being advised to figure how they will meet such restricted distribution rules if and when imposed.

Canned Pea Standard Changed to Use Alkali

TO PERMIT the use of soda, calcium hydroxide and magnesium hydroxide for preserving the bright green color of peas, the standard for canned peas has been modified by the Food and Drug Administration. The change was proposed by a group of important canners desiring to utilize this new process for some of their pack. There was no opposition to the proposal at the time of the hearing.

In the new standard, promulgated on December 1 and effective about March 1, no other change in practice is expected except the use of traces of the named alkalis. Products so processed must be labeled to show that traces of these materials have been added. This labeled declaration was the only request made by spokesmen of F&DA at the time of the hearing, a request which was not opposed by the canners.

Some of the spokesmen of the canning industry have taken occasion to compliment F&DA on the prompt action in this matter. They point out that this is good evidence that the government is not going to permit a standard to become an obstacle to progress when a new method of food processing is developed which could not be used without change in some technical detail of a promulgated standard.

Wickard Sets Up His Organization

Regroups his department into production, distribution and research administrative units

WITHIN a week of the time the executive order was issued appointing him Food Administrator, the Secretary of Agriculture began the realignment of the Department administrative setup according to the order's terms. The changes consist of a regrouping of the Department into three administrative units, Food Production Administration, Food Distribution Administration and Agricultural Research Administration. Outside agencies that may be transferred to the Department of Agriculture as a result of the executive order will become parts of one of these three units, depending on the nature of the work that has been carried on in them.

Herbert W. Parisius, who was an associate director of the Office for Agricultural War Relations, was selected for the post of Director of Food Production. M. Clifford Townsend, formerly administrator of the Agricultural Conservation and Adjustment Administration, was made Associate Director of Food Production Administration.

Roy F. Hendrickson, administrator of AMA, was designated Director of Food Distribution Administration. Clarence W. Kitchen, who was Associate Director of AMA, was named Associate Director of Food Distribution.

Control of Agencies

Agencies now under the control of Mr. Parisius are the Agricultural Conservation and Adjustment Administration (except Sugar Agency); the Farm Credit Administration; the Farm Security Administration; that part of the Division of Farm Management and Cost of the Bureau of Agricultural Economics concerned primarily with the planning of current agricultural production; and that part of the Office of Agricultural War Relations concerned primarily with food production.

PILLSBURY'S "E" PENNANT

The first flour mill to receive the Army-Navy Production Award was that of Pillsbury Flour Mills Co. at Springfield, Ill. This "E" pennant was raised over the mill and each employee received an "E" emblem. Left to right are Col. Crosby N. Elliott, Quartermaster Corps; Helen Traylor and George Turnbull, representing employees; and Philip W. Pillsbury, president of the milling concern.

KELLOGG RECEIVES "E" AWARD

After awarding the Kellogg Co., Battle Creek, Mich., the Army-Navy "E" flag for excellent performance in packing the overseas Ration K, General Edmund B. Gregory, Quartermaster General, received a day's supply of the ration from Mary Barber, the company's home economics director, now on loan to the government as Army food consultant. Ration K kept Captain Rickenbacker and his companions alive.

Agencies that are now under the supervision of Mr. Hendrickson in the new setup of the Department of Agriculture are Agricultural Marketing Administration; the Sugar Agency of Agricultural Conservation and Adjustment Administration; that part of the Bureau of Animal Industry of the Agricultural Research Administration concerned with regulatory activities; and that part of the Office of Agricultural War Relations concerned with food distribution.

That part of the Office of War Relations that is not transferred to one of the two new administrative agencies will continue as an advisory unit of the Secretary's staff. The status and functions of other bureaus and agencies within the department remains unchanged.

Not one of these men who have been appointed to top positions in the new setup have had experience in the business of processing or distributing food.

Dehydrated Foods Frozen, Compressed

THERE has been developed a new process for compressing dehydrated foods into blocks or briquettes. This method makes an additional space saving ranging from 30 percent for dried whole milk to 80 percent for cream of cabbage soup.

The process has been developed by Auto Ordnance Co., Greenwich, Conn., and packaging problems have been worked out by du Pont.

The dehydrated material is quick frozen at temperatures ranging from 20 above to 20 below zero, depending upon the product, thus cooling the fat globules and preventing them from breaking down under the subsequent pressure. The pressure applied ranges from 250 to 2,500 lb. per square inch, also depending on the product.

Cellophane is said to have been found suitable as packaging material for the compressed food, and the products are packaged on high speed machinery at the rate of 120 per minute, which is the rate at which they are compressed. The wrapper is heat sealed.

Ice Cream Cut 20% by WPB

Production of ice cream and other frozen desserts limited to 80 percent of October output

ICE CREAM manufacturers and processors of other frozen desserts faced a sharp cut in production during December and January, when WPB Conservation Order M-271 was issued on December 4. Commercial manufacture of ice cream, frozen custard, milk sherbets and similar desserts was cut to about 20 percent below the estimated 1942-1943 winter output. The new regulation, first rationing order to hit the industry, limited the production of these products to 60 percent of the October, 1942, output, to conserve butterfat in the critical butter shortage.

No producer during December and January may use in the manufacture of frozen milk desserts, more than 60 percent, by weight, of the total milk fat or milk solids not fat, which he used in October 1942. However a minimum production of 60 gal. of ice cream is allowed each producer. The cut in the December and January production to 60 percent of the October output does not mean that output will be reduced 40 percent, because in these months a seasonal drop in production brings manufacture below that of October.

A Time For Teamwork

(*Continued from page 44*)

tion with farm production and processing of farm products, the Department in recent years has given increasing attention to the field of marketing. These marketing agencies have trained staffs that are experienced in cooperating with the food industry in both the purchase and distribution of food. The school lunch, food stamp and Lend-Lease food programs are examples. The important work done by the Department's Bureau of Home Economics is well known in the field of nutrition.

Organizational Setup

In reorganizing the Department in line with the President's order, three major divisions will carry out the work of administering the food program—one for food production, one for food distribution and one for scientific research.

All of the facilities of the Department will be available to farmers, processors, distributors and consumers in their concerted effort to turn out enough of the right kinds of food and to use our supplies wisely.

If all of these great groups work together, concentrate on what is needed most and accept the inevitable wartime adjustments, we can feel reasonably sure that we can feed our fighting men, help feed our allies and afford good diets to families here at home.

This is REAL Conservation

WINDOW CONTAINER APPROVED BY WPB For Food Products

Transparent packaging materials are essential to the war effort. Window cartons permit full visibility (and saleability), but use a minimum of transparent material.

The new WPB ruling permits food packages with windows to replace all-transparent bags. Illustrated is an example of the remarkable saving in vital materials obtained through the use of window packages.

Your nearest Rossotti Packaging Man will be happy to demonstrate the many advantages of window cartons. Feel free to call in this packaging expert on any problem you might have involving cartons, labels, or wraps. No obligation, of course.

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Grade Labeling Required For Canned Products

Price control program to be integrated with grade labeling system for canned fruits, vegetables

STANDARDIZED grade labeling will be compulsory for the bulk of the 1943 pack of canned fruits and vegetables, according to Leon Henderson's announcement in mid-December. Citrus fruits and juices, now being canned, are the first commodities to be affected.

OPA has begun the grade-labeling program because it is thought to be the best mechanical means of instituting equitable and effective price control. Complete inspection of packs will be undertaken by the Agricultural Marketing Administration, by the method outlined in FOOD INDUSTRIES, May 1941. OPA feels that the best means of price control will come through relating the price program to standardized grades, for the protection of canners, distributors and consumers. The labeling regulations will not apply to foods packed for the armed forces.

Government standards, set by AMA, are already available for nearly all of the canned fruits and vegetables packed. Actual labeling to be used in identifying the grades will be optional—either the government's symbols, "A," "B" and "C," or the familiar trade terminology, "Fancy," "Choice" or "Extra Standard," and "Standard." The cost of the necessary imprinting and cost of the grading will be included in ceiling prices. Whether actual ceilings will be higher or lower than those now existing will have to be determined. The percentage of the pack which will fall in the "A" "B" or "C" grade will vary with each fruit and vegetable.

Bakers Propose War Program

Restrictions would gear the industry's operations to wartime conditions

As a contribution to the war effort and as a move to forestall unworkable planning from nonindustry agencies, a special panel of the War Committee of American Bakers Association and Retail Bakers of America has formulated a far-reaching war program. This plan, covering the problems of price control, materials and facilities, manpower and essential food supply, was presented to Food Administrator Wickard on December 10. Following is a summary:

Bread

Product—(1) No one bakery to make or sell more than 6 varieties of bread (maximum of 2 white pan bread) for sale other

Wide World

WOMEN TAKE OVER COLD JOB

Girls have taken over another type of work formerly done by men in the food industries. At the plant of Borden Ice Cream Co., Everett, Mass., they are employed in the hardening room where the temperature goes as low as 30 deg. below zero. They dress warmly in woolen ski suits with coveralls over them, ski boots, skating caps, and heavy woolen gloves beneath leather ones. They have a ten-minute rest period every hour, when they go into a warm room. Left to right you see Betty Richardson, Grace Driscoll and Betty Boudreau stacking ice cream as it comes by conveyor into the hardening room.

than to restaurants. Restaurant breads limited to 8 varieties (maximum of 3 white pan bread.) Maximum weight for any bread 16 oz. (2) No bread dough to be baked. (3) No twisting or cross-panning of pan bread. (4) No bread to be sold sliced. (5) All white bread to be enriched. (6) White pan bread to contain 2 to 4 percent shortening, 3 to 6 percent milk solids and 3 to 6 percent of sugar or other sweeteners. Adequate materials for this, and for enrichment, to be allocated.

Package—(1) No cellophane or other transparent or semitransparent materials for packaging bread. (2) Double-wrapping, inner liners, inserts and outserts, except for label corrections, prohibited. (3) Waxed paper not to exceed 21 lb. paper and 11 lb. paraffiine per ream. (4) Combination loaves prohibited. (5) Maximum of 2 colors and 25 percent ink coverage in printing wrappers. (6) End labels prohibited.

Distribution—(1) Consignment selling prohibited. (2) No Sunday deliveries. (3) "Load factors" basis for ODT Certificates of War Necessity to be dropped, with uniform net reduction of 30 percent below 1941 mileage, after elimination of special deliveries, call-backs and more than one delivery daily. (4) Premiums, prizes and free goods prohibited. (5) Discounts, rebates and allowances prohibited except where open and justified by cost savings. (6) Providing racks, stands or other equipment to customers prohibited.

White Rolls And Buns

Product—(1) No one bakery to make or sell more than four varieties of white rolls and buns for sale other than in retail bakery stores or to restaurants, in any one week. Maximum of nine varieties for sale in retail bakery stores or restaurants. (2) No white rolls or buns to be sold sliced.

Package—Same as the specifications for bread, except semitransparent packaging materials permitted.

Distribution—Same as the specifications for bread.

Cake

Product—(1) No one bakery to make or sell more than 12 varieties of cake for sale other than in retail bakery stores, in any one week. Maximum of 6 basic formulas—3 varieties each—for sale in retail bakery stores.

Package—(1) Waxed paper limitation same as item (3) for bread. (2) Inserts, outserts and adhesive seals, except those bearing required labeling, prohibited. (3) Maximum of 2 colors and 25 percent ink coverage in printing.

Distribution—Same as specifications for bread.

Pie

Product—(1) No one bakery to make or sell pies of more than 6 fillings—3 sizes each—other than to restaurants, in any week. Maximum of 15 varieties—3 sizes each—to restaurants.

Package—Same as for cake.

Distribution—Same as for bread.

Other Bakery Products

(Including sweet yeast-raised products, cookies and doughnuts but not biscuits and crackers)

Product—(1) No one bakery to make or sell more than 10 varieties (of products other than bread, white rolls and buns, cake, pie, biscuits and crackers) for sale other than in retail bakery stores, in any one day. No bakery to make more than 20 such varieties in any one day for sale in retail bakery stores.

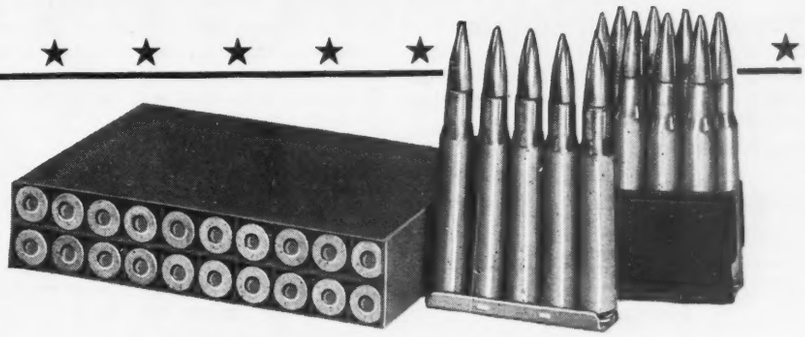
Package—Same as for cake.

Distribution—Same as for bread.

Must Absorb the Tax

MANY industries thought that new taxes could be passed on as increased prices, but only a few commodities are being so handled, notably alcoholic beverages

MORE MANPOWER



The hands that filled clips and cartons with cartridges are now doing other war work

THANKS TO NEW AUTOMATIC MACHINES

It has always been our job to devise new machines that would free the human hand and brain for more important tasks . . . So when we were given the assignment of creating a machine that would load cartridges into clips, we had the designers right in our own organization with the "know how" to do it.

Starting from scratch – with just a few clips and cartridges for experimenting – we designed and built a loading machine for Garand clips and another for Springfield clips in only three months' time. Quantity production followed. Later, we devised a machine for loading .30 caliber cartridges into a carton.

Many other types of machines built by us are being used in the armament program. And our standard wrapping machines, too, are turning out tons of food and other essential supplies for the armed forces, as well as for civilian needs.

Timely assistance for package goods manufacturers

Though extremely busy on war work, we are anxious to assist package goods manufacturers in every possible way. This includes not only servicing of existing machines, but aid in obtaining additional machines of our make, when necessary . . . If you need a wrapping machine, or machines, write us describing the type of wrapping to be done, and our Wrapping Machine Procurement Service will endeavor to put you in touch with a manufacturer who can sell or lease you the right machine.

PACKAGE MACHINERY CO., Springfield, Massachussets
NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO
Mexico: Agencia Comercial Anahuac, Apartado 2303, Mexico, D.F.
Argentina: David H. Orton, Maipu 231, Buenos Aires
England: Baker Perkins, Ltd., Peterborough
Australia: Baker Perkins, Pty., Ltd., Melbourne

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

and coal. The transportation tax of 3 percent on freight bills must be absorbed by the shipper if he quotes a delivered price. If a purchaser buys f.o.b. the supplier's station, then he pays the extra.

Orange Juice Standards

AMA standards for grades of canned orange juice were issued on December 2, effective December 15. Only minor changes were made in this revised draft of the tentative standards, to make the standards as complete and practical as possible.

Genealogy

In order to make it a matter of annual record, this statement is published every January:

FOOD INDUSTRIES was founded in 1928 by McGraw-Hill Publishing Co. Dr. H. C. Parmelee was its first editor. Dr. L. V. Burton succeeded him and is its present editor. Associated with him are: E. S. Stateler, associate editor (now located in the Chicago office); G. L. Montgomery, associate editor; F. K. Lawler, managing editor; Elizabeth B. Shaw, assistant editor; Grace Hightower, assistant editor; R. S. McBride, editorial representative in Washington; and Earle Mauldin, editorial representative in Atlanta, Ga.

War Production Board Orders

Laboratory Equipment—An Amendment to Order L-144, issued Dec. 5, imposes new drastic restrictions on purchase of laboratory equipment. No buyer may acquire an item valued at more than $50 or any quantity of the same item of more than this value without getting authorization for the purpose. Purchases authorized will be on the basis of an AA-4 rating.

Chocolate in Confections—Beginning Dec. 15, the use of chocolate in manufacturing or coating novelty items, coating miniature candy pieces, manufacturing chocolate shot or decorating chocolate candy was prohibited in Order M-145, as amended on Dec. 5. Under the amendment, no person may now accept delivery of or use any material produced from cocoa beans for production of the above items, thus saving additional breakfast cocoa and chocolate bars for Army use.

Cold Storage Butter—WPB on Nov. 20 temporarily froze one-half of the supply of cold storage butter in the 35 principal markets of the United States to assure an adequate supply for the armed forces and Lease-Lend. Order M-267 requires any person who had any butter in his possession between Nov. 6 and Nov. 20, 1942, to set aside 50 percent of the supply of butter he had on hand on Nov. 6 or Nov. 20, whichever was higher. Such butter could not be delivered except on authorization of WPB. Producers who prior to Nov. 21 had delivered such quantities of butter that they could not meet the terms of the Order were required to set aside all of their remaining holdings.

Dairy Products—A shortage in supply of milk and milk products made necessary Order M-259, issued Nov. 25, restricting producers from delivering cream having a milk fat content in excess of 19 percent, except to another producer. However, in any state where a law existing on Nov. 25, 1942, required the milk fat content of cream to exceed 18 percent, a producer may deliver to any person cream having a milk fat content not exceeding by more than one percent the minimum required by the law.

An Amendment to Order M-259, issued Dec. 9, permits delivery to any person or medical institution cream of such milk fat content as may be necessary for supervised medical treatment.

Tin—Further restrictions were imposed on the use of tin in an Amendment to Order M-43-a, issued Nov. 24. Tinned wire still may be used for the packaging of food for human consumption, where such wire will be in direct contact with the food packaged. With strict limitations, wire is still permitted in beverage dispensing units and parts, including pipes, and in retinning dairy equipment such as milk filters, separator disks, cheese vats and filler bowl covers.

Egg Processors in Canada—Preference ratings for equipment, maintenance and repair material assigned by Preference Rating Order P-118 have been made available to Canadian egg processors, giving them equal treatment with egg processors in the United States. An Amendment to the Order, issued Nov. 27, gives the preferred rating to those firms approved by the Special Products Board of Canada for supplying eggs or egg products to that agency or the armed forces, for candling and grading shell eggs, breaking, packaging and freezing liquid eggs, and dehydrating eggs.

Tinplate, Terneplate—Among new permitted uses for tinplate under an amendment to Order M-21-e, issued Dec. 11, are maple sirup evaporators, and linings of drying chambers for milk and egg dehydration.

SCHEDULE OF EVENTS

JANUARY

6– 8—Northwest Canners Association, annual convention, Multnomah Hotel, Portland, Ore.
7– 8—Tri-State Packers, annual convention. No location announced.
9–11—Eastern Soda Water Bottlers Association, Statler Hotel, Boston, Mass.
11–12—United States Brewers' Association and Brewing Industry Foundation, joint meeting, Drake Hotel, Chicago, Ill.
18–20—Ohio Dairy Products Association, Columbus, Ohio.
19–20—National Pickle Packers Association, annual meeting, Chicago, Ill.
24–26—Potomac States Bakers Association, Lord Baltimore Hotel, Baltimore, Md.

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SPARE THE SURFACE
Aluminum, tin and other costly metal equipment in your plant needs more careful handling than ever before. You can conveniently stretch its life by cleaning with Metso.
Metso removes all grease, oil and accumulated dirt, and then rinses free, leaving a bright and sparkling surface. A large Western creamery is mighty proud of its aluminum alloy cans after 3 years of Metso cleaning.
Ask for Metso. Its unique component, called soluble silica, restrains corrosive or etching action. A Metso distributor is near your plant. Name on request.
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METSO
METSO CLEANERS

Processors Told What Lies Ahead

Representatives of government address canners, preservers, dehydrators and freezers

"STANDING ROOM ONLY" symbolizes the degree of interest in the Food Processors' Conference sessions held in Chicago, December 14 to 16. Fifteen hundred attended. Jam-packed conference rooms indicated the eagerness of the audience to obtain helpful information on how they might supply the 400,000,000 cases of canned, 400,000,000 lb. of dehydrated, 600,000,000 lb. of sugar-preserved, and 350,000,000 lb. of quick frozen fruits and vegetables which have been set as the 1943 objectives.

Industry on War Footing

Roy F. Hendrickson, AMA administrator, stated that food production in all its aspects is on a war footing—on a par with munitions manufacture in relation to labor supply, mechanical equipment and repairs and use of products produced. As a base for 1943 production he announced a price-support program for snap beans, corn, beets, carrots, pumpkin, squash and cabbage for processing as well as for the 1943 favorites of peas and tomatoes.

Grade labeling was cited as a wartime necessity so that OPA may correctly enforce its price ceilings.

A. C. Hoffman, director, Food Price Division, OPA, stated that OPA faces the future with much more confidence than a year ago. Soon to be placed under specific ceiling prices are the "frozen-price" foods such as butter, cheese, evaporated milk, poultry, citrus fruits and flour. The new price schedules for the canning industry are not likely to provide for any adjustment of prices of individual firms. Price adjustments are to be made on a regional or industry basis and only when a general condition requires it.

At the present OPA sees no need of placing a ceiling directly on the farm price of canning vegetables. The status of canning fruits of the West Coast may be different because of fresh market demands.

Subsidies are not favorably regarded by OPA. However, if any subsidies are to be paid, OPA favors payments directly to growers rather than to canners. A definite statement was made that individual canners cannot expect ceiling price relief because of a wage increase. To affect changes in ceiling prices, wage increases will have to be considered from a regional or an industry basis rather than from the effect upon a few individual companies.

Study is being made of 1942 profits

WHEN IT COMES TO DISINFECTING FOOD PROCESSING EQUIPMENT

Looks tough . . . "acts" plenty tough . . . but steam usually is only a big bluff when it comes to killing food spoiling bacteria. Here are the facts. Authorities on sanitation agree that a temperature of 170°–180°F maintained for two to five minutes, is required to kill bacteria. Actual tests reveal, however, that only one foot from the nozzle, steam drops more than 30° below the minimum specified for sterilizing.

Disinfecting contaminated containers and processing equipment with steam is at best a gamble . . . a gamble that should not be tolerated in these critical days. In peacetime, spoilage is simply wasteful . . . in times of war it is no less disastrous than sabotage. Food is just as important as arms and ammunition in the winning of this war!

How hot is steam?
Just place a thermometer at varying distances from the nozzle of a steam hose and see for yourself.

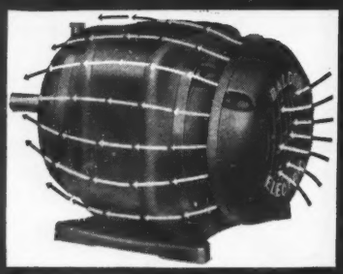
For effective control of food spoiling bacteria, mold and yeast, more and more food producers are turning to Diversol, a chlorine bactericide. Although powerful and quick-acting, Diversol will not corrode or damage equipment thus avoiding undesirable metallic offtastes and flavors. Comes in pure white, readily soluble crystals of uniform fixed strength. Simply add to water and this streamlined bactericide is ready for action . . . just rinse or spray the previously cleaned equipment. There is no sludge, no muss, no film, no scale. DIVERSOL is non-poisonous and leaves no after-taste or disinfectant odor. It is the ideal bactericide for the food plant.

Diversey D-Men At Your Service

Today, more than ever before, problems in sanitation require the individual attention of trained experts working under the direct supervision of research chemists and bacteriologists. Such are the Diversey D-Men . . . at your service . . . able and anxious to help you solve your cleaning and sterilizing problems. Write to The Diversey Corporation, 53 W. Jackson Blvd., Chicago, Ill.

NEED HELP WITH A SANITATION PROBLEM? Just call a DIVERSEY D-MAN

TOTALLY ENCLOSED (DUST-PROOF) MOTORS AT NO EXTRA COST



Illustrating forced-air cooling over entire exterior of motor frame.

BALDOR offers you totally enclosed, dust-proof motors of Streamcooled design in integral sizes at same prices as standard motors.

When you specify BALDOR, you get Special Motor features at NO EXTRA COST to you.

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21 YEARS

BALDOR
BETTER MOTORS

as a guide in setting 1943 ceiling prices. The object is to keep 1943 profits under control at lower than "exorbitant" levels. Because much packing will be done in glass during 1943, OPA will recognize direct cost differences in setting the new dollars-and-cents ceilings. The differences recognized will be in the cost of container, freight and direct labor of packing in glass as compared with packing in tin.

Help on Labor Problems

The agricultural labor problem is being studied from the viewpoint of: (1) Raising farm wages, (2) directing movement of seasonal workers, (3) greater utilization of local labor; particularly women and older school children, and (4) decreasing the number of experienced workers needed through improved supervision, training of less experienced workers and increasing responsibilities of promising young workers.

Recommendation was made that canners inventory their personnel requirements to the end that proper allocation may be made of existing manpower through the Manpower Commission in line with the Manning Table Plan and the Replacement Schedule.

In its resolutions the National Canners' Association went on record for an all-out production of canned goods and held collective grade labeling and overprinting of labels to be unnecessary and an interference with production.

Dehydrators were informed that the total desired production for 1943 consists of:

White potatoes	137,000,000 lb.
Sweet potatoes	32,000,000 lb.
Cabbage	30,000,000 lb.
Onions	20,000,000 lb.
Beets	26,000,000 lb.
Rutabagas	9,000,000 lb.
Carrots	13,000,000 lb.
Apples	20,000,000 lb.
String beans	12,000,000 lb.
Tomato products	18,000,000 lb.
Turnips	8,000,000 lb.
Cranberries	4,800,000 lb.
Mixed green vegetables	500,000 lb.
Peas	12,000,000 lb.
Corn	20,000,000 lb.
Soups (total)	200,000,000 lb.
Green pea soups	27,000,000 lb.
Yellow pea soups	27,000,000 lb.
Bean soups	33,000,000 lb.
Mixed noodle soup	5,000,000 lb.
Soya soups	55,000,000 lb.

Packers of frozen foods and preservers were informed that there will be uniform ceiling prices on "cold-pack" fruits to take care of higher cost of fresh fruits and labor.

Announcement was also made that 2,000 tons of strategic metals have been set aside by WPB to permit expansion of the quick freezing industry to about 40 percent over its 1942 capacity for vegetables only. No expansion is contemplated for 1944. No tinplate will be permitted for the 1943 pack unless found positively necessary for cold-pack cherries.

In case of cellophane and wax paper shortage to the point of priority allocation, fruit and vegetable freezers will get the highest rating.

Request is made by the government central procurement office that each plant set aside 44 percent of its pack as "offered" to the government for purchase. Some 71,000,000 lb. of frozen vegetables is to be purchased by the government in that manner.

CAPITAL VIEWS

NO FAT TO SALVAGE—Salvage of household fats has been disappointing to WPB. It will be more disappointing next year. There will be less meat, especially less bacon, from which to save "excess" fat. Moreover, the housewife now makes more gravy and uses more fat for home cooking, even as a substitute for scarce shortening materials. This home use of recovered meat fats may become a significant factor in offsetting shortages as butter, lard and other shortenings become more difficult to get.

RETURN CARGO—Army operations in Africa insure movement of many supply ships to that continent. Return cargoes will be brought. Among these will be needed minerals and other scarce strategic materials. Also expected are wanted oils and oil seeds, cocoa and a few other scarce foodstuffs. This may somewhat relieve shortages otherwise very serious for food manufacturers. However, the burden on food supplies will be greatly increased because more extensive military operations abroad require greater food supply for the troops and also more to feed local populations released from Axis domination. These increased demands in a large measure cause the threats of more extensive rationing of foods next year in this country.

SUBTERFUGE—Some smart food distributors thought that by changing the label on a container, usually a can, they could change its character and boost its ceiling price. OPA said "No," very logically. The facts as to the contents of the container, more than the pretty pictures outside, govern its classification for price.

"SPOILED EGGS"—Much unfortunate publicity for dried eggs was unfairly given in the recent wholesale casualty list at the Western asylum when inmates suffered seriously from eating scrambled eggs. We wonder whether all of those who were horrified by the first reports later learned that it was merely careless mixing in of insect powder, not spoilage of the eggs, which did the damage. It is so easy to damn a product seriously; and so hard to clear its smirched name later.

CROSS HAULS—Each important food industry must find a way to minimize the railroad burden of distribution of its products. Even trading of customers by competitors

REELECTED BY ABI

R. E. Pearsall, of Armour & Co., Chicago, has been reelected president of American Butter Institute. Also reelected were: Vi e-president, G. W. McLatchey, American Dairies, Kansas City, Mo.; executive secretary and treasurer, N. W. Hepburn, Chicago.

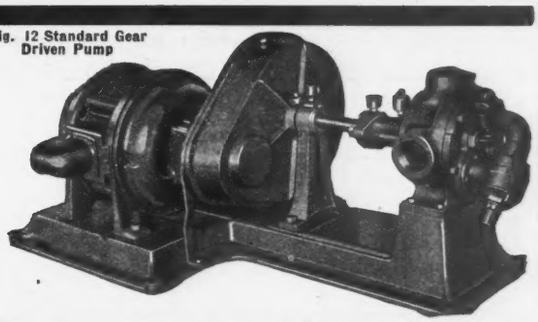
is going to be sanctioned, or even required, for some commodities. For example, it is talked that the Eastern Seaboard must eat only Maine potatoes and the Middle and Far West areas must get along with Idaho potatoes. Hauling Idaho potatoes to the East or Maine and New York potatoes to the Mississippi Valley needlessly burdens the freight cars of the country, according to this theory. No one knows how far ODT and OPA will go if they get started on this type of regulations.

PRICE "PREMIUMS"—Certain high-quality goods may be sold at price premiums higher than normal ceiling prices. However, it requires observance of exact rules in order to make such practice legal under OPA regulation. For example, a certain type of green coffee which sold at price premiums during the four weeks prior to December 8, 1941, may be sold at comparable premiums above ceiling prices for normal grades of coffee. It must be understood that mere superiority of quality is not enough. The superiority must be such that it was recognized by actual price practice before Pearl Harbor.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded December (thousands)	Total Awarded 1942 (thousands)
Bakery	$100	.....	$115
Beverages	280	.....	1,227
Canning and Preserving	40	.....	545
Cold Storage Plants	40	$40	665
Confectionery	.....	.....	.....
Grain Mill Products	.....	100	735
Ice Manufactured	.....	.....	189
Meats and Meat-Products	.....	.....	263
Milk Products	200	80	1,852
Miscellaneous	135	40	4,467
	$795	$260	$10,049

Fig. 12 Standard Gear Driven Pump



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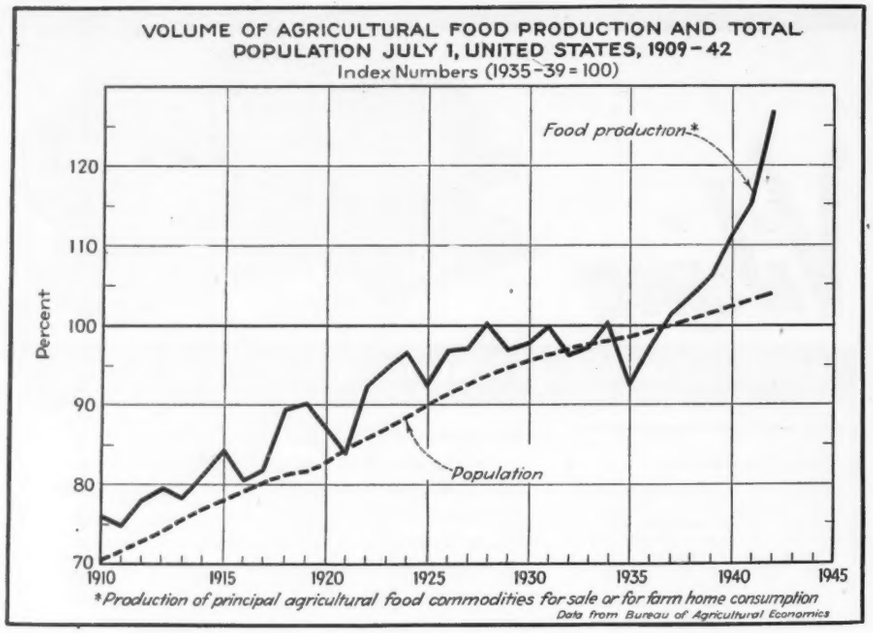


Grain Price Rises Push Indexes Up

In spite of price ceilings on most commodities, increases of prices of those still unregulated, plus the effect of ceiling "hikes" by OPA, combined to shove commodity prices indexes still higher in the four-week period from November 14 to December 12, 1942. The weekly general commodity price index of *The New York Journal of Commerce* rose from 104.6 to 105.0 for for the period, while the same publication's food index was steady at 107.2, and its grain index rose from 93.0 to 99.3.

The indication that rising grain prices had much to do with the increase in the commodity prices is borne out by the spot price situation. Wheat, No. 2 hard winter, Kansas City, increased from $1.22 to $1.28 for the period, while corn, No. 3 yellow, Chicago, jumped from 82¾c. to 91c. Rye also upped sharply in the four weeks, going from 79½c. to 88⅞., and barley rose in the same weeks from 86¼c. to 94¼c. Flour was unchanged, at $6.45. All other important food commodities were steady under ceilings.

Wickard Sets '43 Food Goals

Record food production, price support program are announced for this year

Food-for-freedom goals for 1943, calling for the highest production in the history of American agriculture, were announced today by Secretary of Agriculture Claude R. Wickard. The goals are designed to shape next year's U. S. farm production to the needs of the United Nations.

At the same time, Secretary Wickard announced a price support program which pledges the Department to "so far as possible, work out and maintain a price policy during the year which will give maximum price assistance to the production program." Included in the program are specific price support announcements for many major farm commodities.

In general, the goals are aimed at maintaining or exceeding the record level of production attained this year, but there are significant changes from the 1942 production pattern which throw sharp emphasis on crops and livestock most essential to the war effort. The goals are subject to any revisions which may be made necessary by military or other developments.

The accompanying table compares 1943 goals with 1942 goals and with estimated 1942 production.

Production Goals—1942 and 1943.

Commodity	Acres or numbers	1942 goal	1942 reported	1943 goal	1943 goal as percentage of 1942 goal	1943 goal as percentage of 1942 reported
		Thousands	Thousands	Thousands	Percent	Percent
Wheat	A	55,000	53,427	52,500	95	98
Rye [2]	A	3,550	3,868	3,600	101	93
Rice	A	1,320	1,481	1,380	105	93
Corn	A	[1] 93,750	91,098	95,000	102	104
Oats	A	40,000	40,600	37,300	93	92
Barley	A	16,000	18,193	18,000	112	99
Grain sorghum	A	10,000	9,221	10,000	100	108
Flaxseed	A	4,500	4,675	5,000	111	107
Soybeans for beans [3]	A	9,000	10,900	10,500	117	96
Peanuts [3]	A	5,000	4,173	5,500	110	132
Dry beans	A	2,600	2,376	2,800	108	118
Dry peas	A	665	530	665	100	125
Sugarcane	A	330	331	340	103	103
Sugarbeets	A	1,050	1,061	1,050	100	99
Potatoes	A	[1] 3,060	2,845	3,160	103	111
Sweet potatoes	A	850	757	757	88	100
Commercial truck crops	A	1,840	1,738	1,720	94	99
Fruit (fresh)	Tons	15,018	15,271	14,610	97	96
Cattle and calves	Lb. [4]	9,585,000	10,160,000	10,910,000	114	107
Sheep and lambs	Lb.	940,000	1,009,000	990,000	105	98
Hogs	Lb.	11,125,000	10,800,000	13,800,000	124	127
Lard	Lb.	2,820,000	2,500,000	3,400,000	121	136
Milk	Lb.	125,000,000	120,000,000	122,000,000	98	102
Eggs	Doz. [5]	4,200,000	4,414,000	4,780,000	114	108
Chickens	Lb. [4]	3,118,000	3,118,000	4,000,000	128	128
Turkeys	Lb.	500,000	485,000	560,000	112	115

[1] Midpoint of range. [2] Harvested acres.
[4] Dressed weight. [5] Total production.

Beef Outlook Better

Reversing the situation that existed several months earlier, November saw stocker and feeder cattle reach the Corn Belt in record numbers, so that now the total for the last half of 1942 is well above the corresponding period of 1941, although somewhat smaller than in 1939 and 1940.

This situation, combined with the relatively high prices now current—the highest in 22 years—have brought the cattle from the Western ranges to the feed lots. This, in turn, promises heavier cattle for slaughter, in place of the relatively light animals that have made up a good part of recent supplies.

Supplies of Fats Become Tighter

In spite of the fact that factory and warehouse stocks of fats and oils increased slightly in recent months, as the record 1942 oilseed crops began to be crushed, supplies continue at low levels and demands soar. Butter supplies have become increasingly tight, particularly since the government freeze of 40 percent of storage stocks in late November. In many markets, butter has become unavailable to consumers, a situation immediately reflected by a 7 or 8 percent rise in the sales of oleo.

Even though milk production continues to run at levels higher than in past years, demand for other manufactured dairy products has caused butter output to decline. As a partial corrective, the manufacture of ice cream has been limited for the winter months and heavy fluid cream has been withdrawn

from the consumer market. However, with continually increasing demands for dried whole milk, cheese and other dairy products for military and lease-lend purposes, butter supplies are likely to be even further restricted in 1943, at least until the Spring season of flush milk production.

Lard production in early 1943 should be well above normal, because of the feed supply situation and the large number of animals available for slaughter. Vegetable oils and shortenings also are likely to be available in more than normal quantities, particularly in view of the large soybean and peanut crops. However, stocks of both lard and vegetable oils have reached abnormally low points and war demands may be expected to rise during the next year. Consequently, even though total domestic output will be larger than ever before, largely offsetting lack of normal imports, the increased demand is likely to bring about a situation demanding strict civilian rationing of these products.

The brightest spot in this situation lies in the possibility of increased vegetable oil imports from Africa. Tropical West Africa is a good source of vegetable oils, and returning ships may be able to bring in considerable quantities. Time alone will show, however, what if any help can be obtained from this source.

INDICATORS

Flour production in November, 1942, as reported by *The Northwestern Miller*, for mills accounting for 65 percent of U. S. output, was 6,237,133 bbl., compared to 6,946,617 bbl. a month earlier and to 5,645,042 bbl. in November, 1941.

Sugar crop of Cuba, 1942-1943, will be purchased in its entirety by the Commodity Credit Corporation. While this crop will probably exceed 3,000,000 tons, requirements of lease-lend and the military will cut the quantity available for U. S. civilian supply.

Cocoa beans delivered to the United States in 1942, up to December 10th, totaled 1,392,331 bags, compared to 4,740,955 bags for the corresponding 1941 period.

Cucumber crop for pickles in 1942 was reported in December at 8,453,000 bu., a higher figure than that reported in November, and a record output for this crop.

Milk, fluid, sold in October, 1942, was 8.34 percent greater than the sales in October, 1941, according to Milk Industry Foundation.

Butter, creamery, produced in October, 1942, was estimated by the U. S. Department of Agriculture at 126,265,000 lb., compared to 140,130,000 lb. produced in October, 1941, and to an average 1931-1940 October output of 128,383,000 pounds.

Butter, creamery, produced in the first ten months of 1942 totaled 1,555,250,000 lb., down 5 percent from the 1,640,164,000 lb. produced in the corresponding period of 1941, but 4.8 percent above the 1931-1940 average.

Cheese, American, produced in October, 1942, totaled 58,800,000 lb., compared to 66,887,000 lb. in October, 1941. However, this figure was 54 percent over the 1931-1940 average October production.

Cheese, American, produced in the first ten months of 1942 totaled 832,100,000 lb., compared to 637,350,000 lb. for the corresponding period of 1941 and to an average for a like period in 1931-1940 of 419,090,000 pounds.

Evaporated milk produced in October, 1942, was estimated at 208,445,000 lb., 26 percent below production in October, 1941, but 39 percent above the 1936-1940 average. The total for the first ten months of 1942 was 3,193,515,000 lb., an average of 18 percent over the same period of 1941.

Dried skim milk produced in October, 1942, totaled 36,000,000 lb., according to the Bureau of Agricultural Economics. This compared to 29,169,000 lb. in October, 1941, and was 26 percent over the 1936-1940 October average.

Dried skim milk produced in the first ten months of 1942 totaled 551,000,000 lb., up 32 percent over production in the corresponding 1941 period.

Dried whole milk produced in October, 1942, totaled 6,750,000 lb., compared to 4,704,000 lb. made in October, 1941, and 259 percent above the 1936-1940 average output for the period.

Dried whole milk produced in the first ten months of 1942 totaled 51,110,000 lb., an increase of 30 percent over the corresponding 1941 period.

Condensed milk, all kinds, produced in October, 1942, totaled approximately 67,000,000 lb., about 8 percent increase over October, 1941.

Eggs, dried, produced in October, 1942, totaled 22,440,000 lb., up 211 percent over the 7,226,673 lb. produced in October, 1941.

Eggs, frozen, packed in October, 1942, totaled 1,141,000 lb., compared to 1,951,000 lb. in October, 1941.

Chicks hatched by commercial hatcheries in October, 1942, totaled 22,955,000, a gain of 12 percent over the corresponding month of 1941. For the first ten months of 1942 chick production was 13 percent above the like period of 1941, which was the previous high record.

Oleomargarine sales, as indicated by sales of internal revenue stamps, totaled 34,632,926 lb. in October, 1942, an increase of 5.9 percent over October, 1941. Sales for the first ten months of 1942 were 277,647,794 lb., a decrease of 7.8 percent below sales for a like period of 1941.

Apple production, final 1942 commercial crop figures, is now estimated at 127,538,000 bu., an increase of 5 percent over the preceding year.

Beer sales in October were 5,626,000 bbl., up 14.3 percent above sales a year earlier. For the first ten months of 1942, beer sales were 54,616,000 bbl., 13.4 percent over a like period of the preceding year.

Orange production for the 1942–1943 season is now estimated by the U. S. Department of Agriculture at 84,144,000 boxes, compared to 84,534,000 boxes last year.

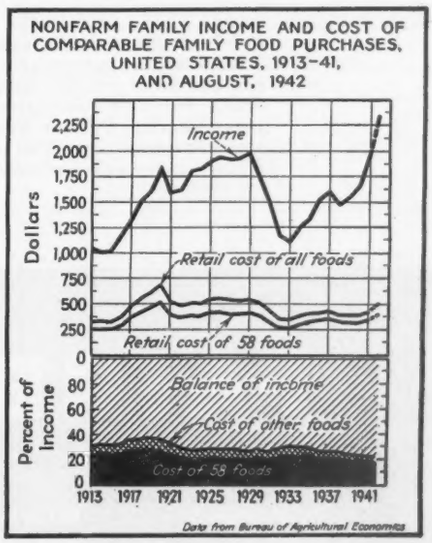
Grapefruit production for the 1942–1943 season is forecast by the Department of Agriculture at 45,533,000 boxes, an increase of 13 percent over last year.

Lemon production for the current season is estimated at 13,650,000 boxes compared to 11,753,000 boxes last season.

Business activity index of *Business Week* for December 5, 1942, stood at 189.6 compared to 188.7 a month earlier, and to 163.0 a year before.

Weekly wholesale food price index of Dun & Bradstreet was $3.97 on December 8, 1942, a rise of 17.8 percent above the figure of $3.37 registered in the corresponding week a year earlier.

Cost of living index of the National Industrial Conference Board stood at 100.3 in November, 1942, compared to 99.7 in October, 1942, and to 92.9 in November, 1941.



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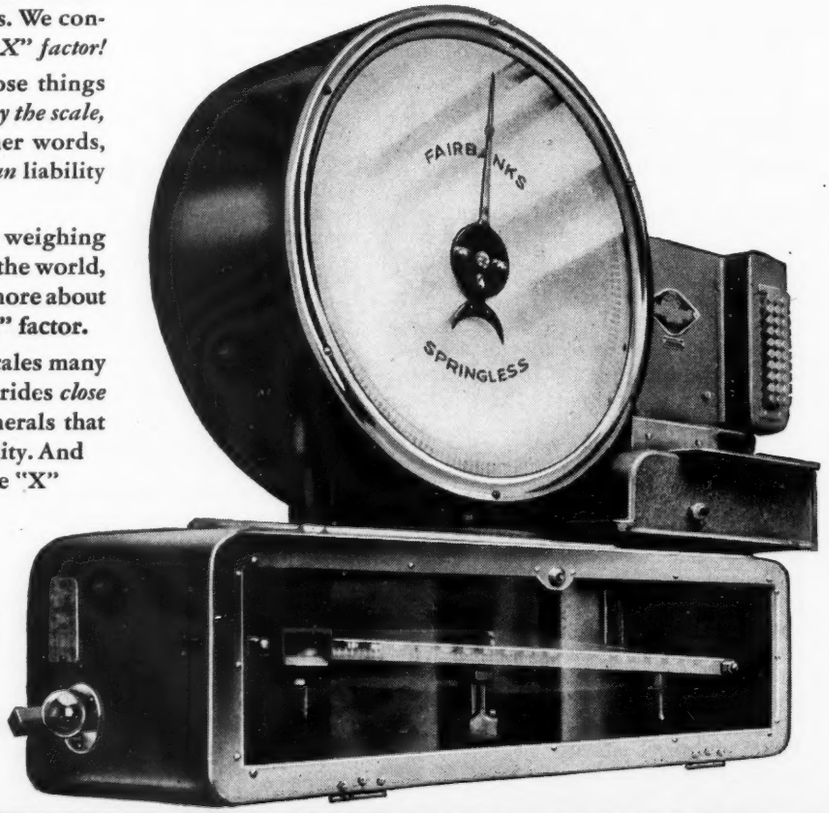

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INDUSTRY

Armour & Co., Chicago, has issued a booklet, "Food for Freedom," explaining the company's part in the war feeding program.

H. C. Baxter & Bro.'s new plant in Maine has begun operation of a new continuous dehydration system, processing white potatoes in Julienne form. Instead of loading the blanched potatoes on trays which are placed on trucks, the plant has a continuous conveyor dehydrater.

Birds Eye Frosted Foods Sales Corp. has started packing operations in the recently completed packing plant of Adams Garden Farms project at Harlingen, Tex. String beans, broccoli and spinach are quick frozen.

Borden Co.'s Farm Products Division, New York, has transformed five motor vehicles into fully equipped air raid emergency ambulances, placed at the disposal of the American Red Cross.

Citrus Concentrates, Inc., Dunedin, Fla., has begun production of concentrated fruit at its new plant in that city. The plant will turn out 400,000 gal. of concentrates annually.

Cooperative Olive Products Association, a group representing 60 percent of all California olive oil production, has recently been organized in Fresno, Calif.

Dixie Frosted Foods, Birmingham, Ala., will open a new quick frozen food processing plant at Georgiana, Ala., with a capacity of 25 tons a day. The plant will use the TVA process of immersion freezing.

Hecker Products Corp. and The Best Foods, Inc., were scheduled to merge into one operating company on Dec. 31, following purchase by Hecker Products Corp. of the 29 percent ownership in The Best Foods, Inc., formerly held by General Foods Corp.

Iowa Packing Co., Des Moines, Ia., has begun construction of a $240,000 plant in that city.

Mexican-American Flavors Co., Ltd., a subsidiary of Pepsi-Cola Co., has been formed at Monterrey, state of Neuvo Leon, Mexico. The new firm, with capital in excess of $50,000,000, has made a deal with the National Sugar Producers Union of Mexico for $15,000,000 of sugar.

Rochester (N. Y.) Packing Co., Albany (N. Y.) Packing Co. and the Tobin Packing Co., Fort Dodge, Ia., have merged. The combined sales volume this year totals more than $40,000,000.

FREDERICK C. HEINZ

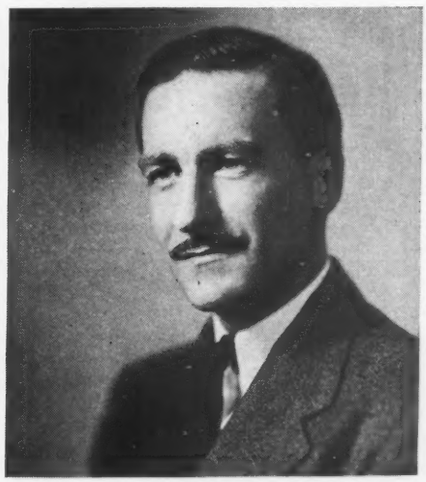
Frederick C. Heinz has been appointed special assistant to the president of H. J. Heinz Co., Pittsburgh, Pa., Mr. Heinz has been associated with the company since 1916 and has had broad experience in all phases of its manufacturing operations.

WILLIAM M. ROBBINS

William M. Robbins, vice-president of General Foods Corp., New York, and president of General Foods Sales Co., Inc., has been appointed Assistant Deputy Director General of WPB, under Director General Dodge, in charge of WPB staff functions.

RAY A. YARNELL

Ray A. Yarnell, prominent in the southern dairy trade, has been elected president of Southern Ice Cream Manufacturers, at the annual meeting in Atlanta, Ga.



T. EDWARD DAVIS

T. Edward Davis, former general counsel and secretary of Jewel Tea Co., has become executive vice-president, National Retail Tea and Coffee Merchants Association.

Sheffield Farms Co. will spend $50,000 in constructing an addition to its milk bottling plant in Newark, N. J.

Summerland Evaporating Co., Ltd., has begun operation of its plant in Summerland, B. C. At present the plant is turning out fruit for the mincemeat manufacturing trade, and will expand into other products later.

Union City (Tenn.) Canning Co. will rebuild its canning plant, which was recently destroyed by fire at a loss of more than $50,000.

United States Beet Sugar Association, Washington, D. C., has published a booklet dealing with the industry's position in our national economy.

Vacudri Corp. is the new name adopted by Calvac Corp., Oakland, Calif. The change was made because of the confusion of the name with other corporate abbreviations.

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Robinson Engineers are at your service! Avail yourself of their experience and of the facilities of our modern testing laboratory. Illustrated catalogs on request for any "Unique" equipment.

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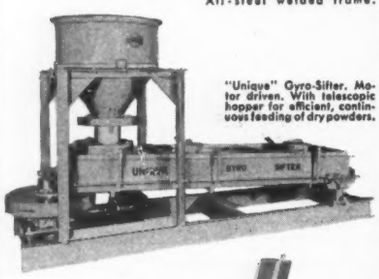
"Unique" Tumbling Prism Mixer. Driven by gearhead motor. For handling dry powders that cannot stand much agitation. All-steel welded frame.



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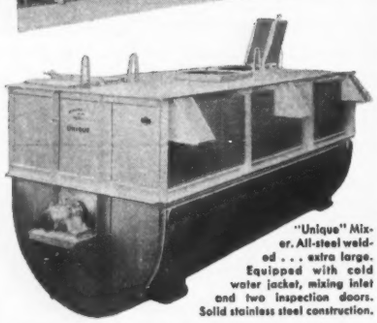

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PERSONNEL

John J. Antun, vice-president of Merchants Refrigerating Co., has been elected president of Eastern Frosted Foods Association. Vice-president is M. T. Zarotschenzeff, technical director of National Frosted Foods.

John L. Baxter, of H. C. Baxter & Bro., Brunswick, Me., has been appointed a collaborator with the Agricultural Marketing Administration. He will advise AMA with regard to canning, quick freezing and dehydration problems.

C. W. Cook has been appointed chief engineer of General Foods Corp., succeeding Elmer J. Grimmett, who recently became manager of eastern plants.

Robert E. Crowley has been appointed vice-president of Sheffield Farms Co. Mr. Crowley will continue as secretary of the company in charge of all financial matters, but will relinquish his post as controller to Philip W. Koebig. H. S. Tuthill has been appointed general sales manager for Sheffield.

L. H. Crumley has been named manager of the Birmingham, Ala., plant of Swift & Co., succeeding J. L. Thweatt, transferred to Baltimore.

Ernest Hollmuller has been elected president of John Reber Pastry Co., New York, succeeding Louis L. Sommer.

H. F. Krimendahl, head of Crampton Canneries, Inc., Celina, Ohio, has been appointed a consultant on requirements of critical materials for canned and other food products at Washington, D. C.

L. Charles Mazzola, secretary of Ivanhoe Foods, Inc., Auburn, N. Y., is now Chief, Subsistence Section, Cost Analysis Branch, Fiscal Division, Office of the Quartermaster General, Washington, D. C.

PATRICK D. FOX

Borden Co. has announced that Patrick D. Fox, vice-president, has retired after 46 year's association with the company. He has been an outstanding leader in the dairy industry, particularly in the fluid milk field.

W. Ennis Parker, Pomona Products Co., was elected 1943 president of Georgia Canners Association at its first annual meeting, held recently.

George V. Robbins, general manager of the coffee division of California Packing Corp. with headquarters in Brooklyn, N. Y., has been elected a director of the company.

Nathan B. Swift, manager of Swift & Co.'s branch at Watertown, S. D., has succeeded B. C. Darnell, retired, as manager of the North Portland, Ore., plant.

H. B. Taylor, of Northwestern Yeast Co., Chicago, Ill., is general chairman of the Food Section, National Safety Council, for 1943.

Donald K. Tressler, professor of chemistry, New York State Agricultural Experiment Station, Geneva, N. Y., on Feb. 1 will begin work with General Electric Co. in the department of food research.

Michel P. Vucassovich, food technologist of Gordon-Pew Fisheries Co., Gloucester, Mass., has temporarily joined the Department of the Interior, Fish and Wildlife Service, Technological Laboratory, at College Park, Md. The government is attempting to salt mullet successfully to help piece out the Puerto Rico food supply and has enlisted the assistance of Mr. Vucassovich.

R. R. Williams, of the Bell Telephone Laboratories, New York, and discoverer of thiamin, is now in Washington working on the rubber development program.

DEATHS

Eric G. Annell, 58, former president of Oatman Condensed Milk Co., Dundee, Ill., and treasurer and director of the Evaporated Milk Association, Dec. 9, in Dundee.

Edgar James Hotchkiss, 48, chairman of the board of directors of Spaulding Bakeries, Inc., Dec. 7, in Binghamton, N. Y.

Crawford T. Johnson, 69, head of the Birmingham, Ala., Coca-Cola Bottling Co. since 1902 and company executive in many other Southern cities, Dec. 9, in Birmingham.

Charles G. Linker, 59, vice-president of American Maize-Products Co., Nov. 28, in East Orange, N. J.

Richard Meyer, bakery specialist for the Office of the Quartermaster General, Dec. 10, in Washington.

Dudley L. Page, 97, founder of the Page & Shaw Candy Co., Nov. 26, in Lowell, Mass.

Charles B. Phelps, 83, former head of Phelps, Krag & Co., coffee and tea import-

JOHN W. LUCE

Standard Brands, Inc., has reported the death of John W. Luce, 53, vice-president in charge of manufacture, purchasing and traffic, and a member of the board of directors, Nov. 24, in New Rochelle, N. Y.

ers, and a national figure in the tea and coffee trade, recently, in Detroit, Mich.

Ben Stitt, New England manager of the Colonial Molasses Co., Nov. 9, in Boston, Mass.

ASSOCIATED INDUSTRIES

The Army-Navy "E" award has been presented to several more manufacturing plants recently: Brunner Manufacturing Co., Bound Brook Oil-Less Bearing Co., C. M. Kemp Manufacturing Co., Jessop Steel Co., and the New Departure division of General Motors. Homestead Valve Manufacturing Co., Inc., has been awarded the U. S. Maritime Commission's "M" pennant.

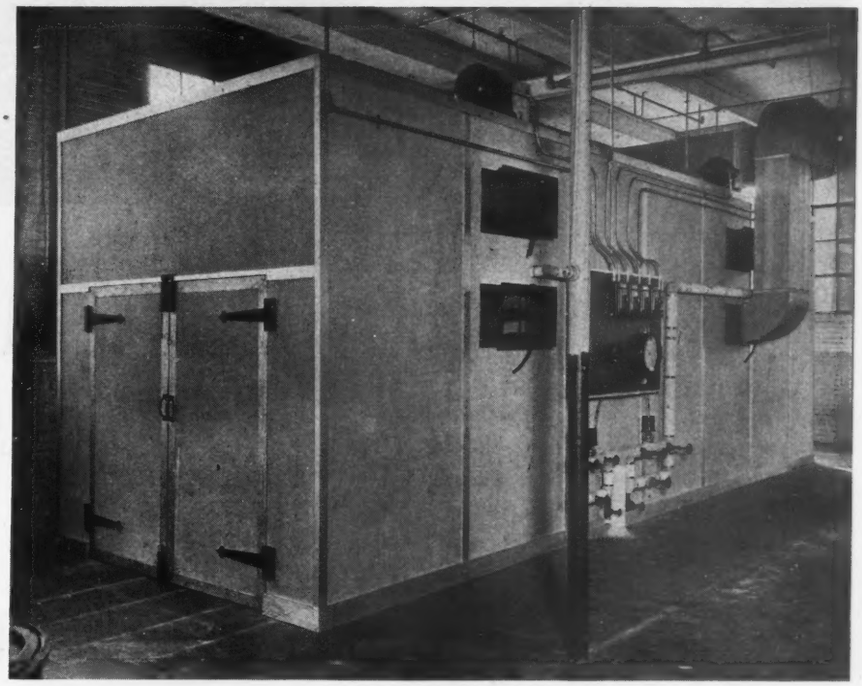
Container Corp. has announced that Dr. Robert A. Diehm, formerly with Rohm & Haas Co., Philadelphia, has been made technical director of the organization.

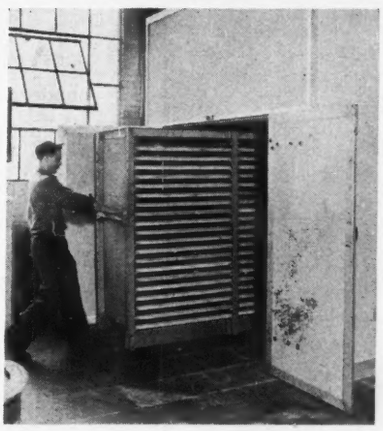
Goodall Rubber, Inc., and Hamilton Rubber Manufacturing Co., Trenton, N. J., Hewitt Rubber Corp., Buffalo, N. Y., Lee Rubber & Tire Corp., Conshohocken, Pa. and Minnesota Mining & Manufacturing Co., St. Paul, Minn., have pooled their resources in the National Synthetic Rubber Corp., to aid the government's program.

B. F. Goodrich Co., Akron, Ohio, has begun production in a new government-financed synthetic rubber plant, located in Kentucky, a unit in the synthetic rubber program which calls for production of more than 875,000 tons annually.

James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, is sponsoring a $6,750 annual award program in the field of undergraduate engineering study, open from Dec., 1942, to April, 1943.

FOOD DEHYDRATION





Is DEHYDRATION THE ANSWER To Your Problems?

DON'T delay your serious investigation of dehydration longer . . . for with the rapid expansion of this field, the freedom from the bothersome restrictions you now have, and the ready market for dehydrated foods . . . dehydration may be the answer to your problems. Dehydration will help win the war and will help you maintain production.

"Industaire" Dehydration engineering and equipment are based on the knowledge gained in years of industrial drier experience. Our engineers will gladly discuss the problems of dehydration with you.

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Evenness of drying . . . top to bottom, side to side.

Perfect control of temperature and humidity.

Better staging of drying . . . tunnel automatically divided into control sections.

Prompt delivery.

We Can Deliver Now

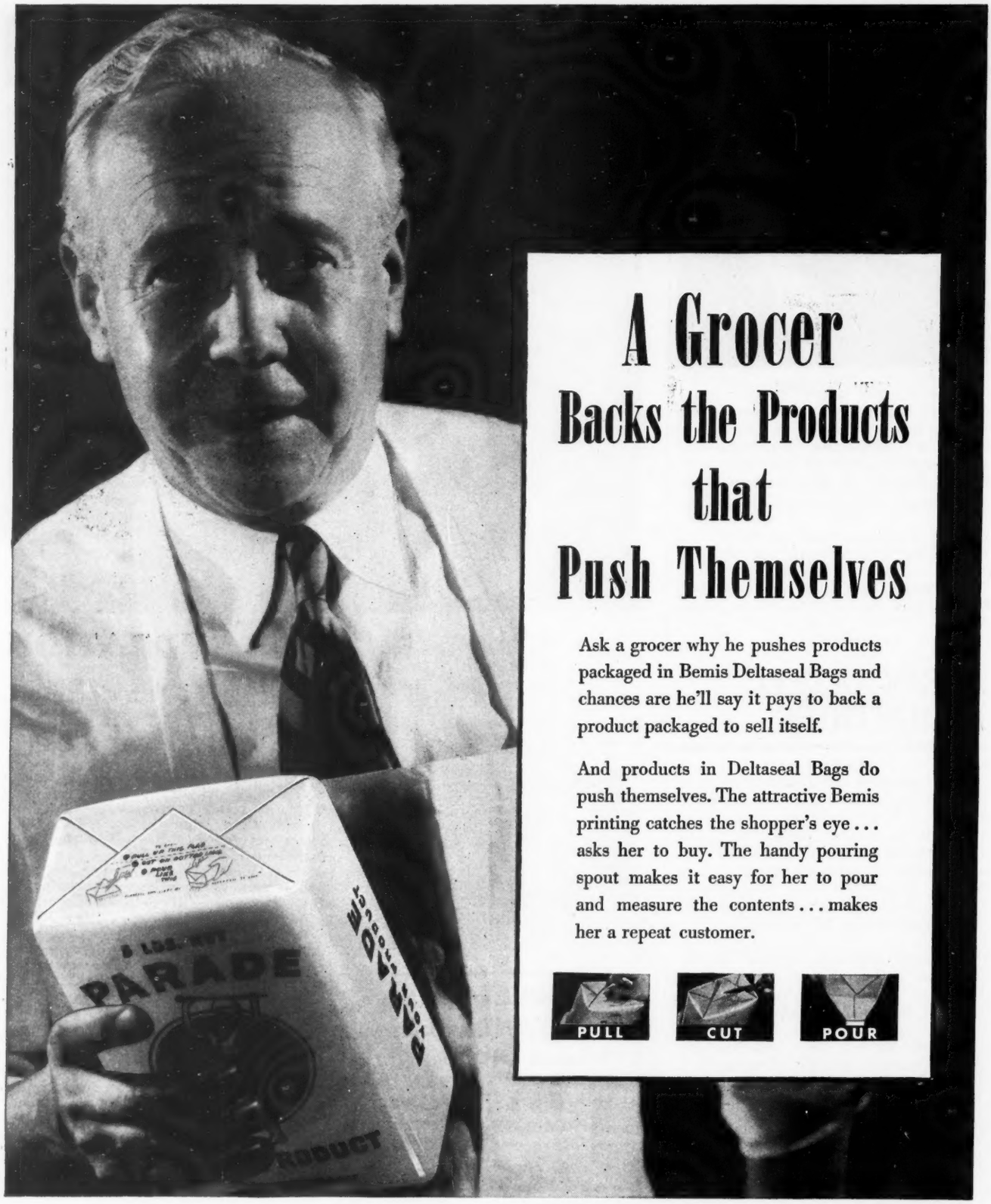
With "Industaire" service you not only get scientific designing and sound building . . . to give you maximum efficiency in your dehydration set-up . . . but you also get fast service. Because "Industaire" Dehydration Equipment is built to a large extent of non-critical materials, we can design, build and install your dehydration equipment promptly and economically.

Investigate. Send for Detailed Dehydration Equipment Bulletin without obligation.

INDUSTRIAL AIR COMPANY

Westwood, Massachusetts

Dehydration Engineering and Equipment



A Grocer Backs the Products that Push Themselves

Ask a grocer why he pushes products packaged in Bemis Deltaseal Bags and chances are he'll say it pays to back a product packaged to sell itself.

And products in Deltaseal Bags do push themselves. The attractive Bemis printing catches the shopper's eye . . . asks her to buy. The handy pouring spout makes it easy for her to pour and measure the contents . . . makes her a repeat customer.

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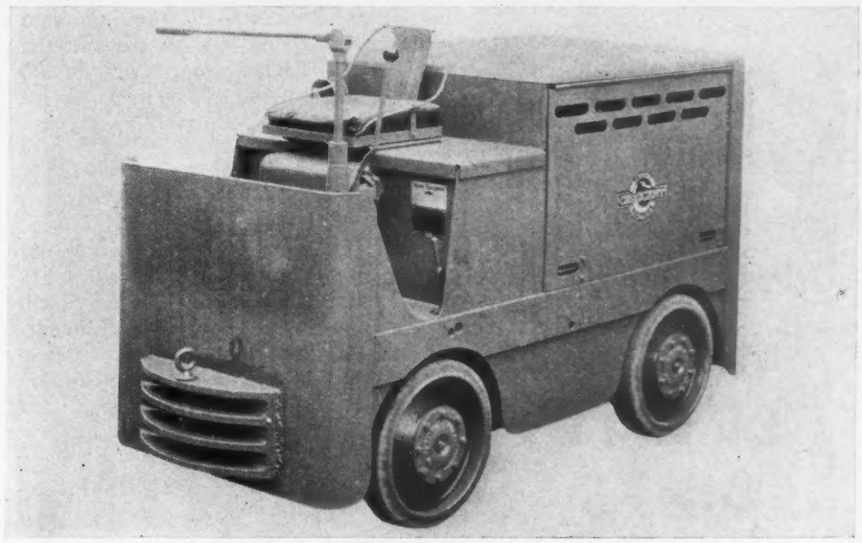
FOOD EQUIPMENT NEWS

Four-Wheel Drive Industrial Tractor

CRESCENT TRUCK CO., Lebanon, Pa., is now making Model NTTD, a four-wheel drive industrial tractor. This unit is powered by two heavy-duty tractor drive units including two motors and drives to all four wheels. Four-wheel extra large external contracting brakes are provided for braking on all wheels at equal pressure. The draw-bar pull provided is 800 lb. normal, 3,600 ultimate. Overall length is 84 in., the wheelbase 48 in. and the overall height 59 in. The manufacturers claim that this unit is the most powerful of all electric industrial tractors.

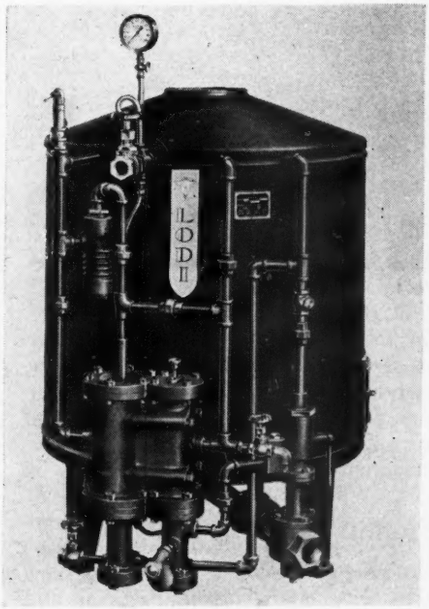


Four-wheel drive electric industrial tractor.

Steam Generator

SUPER MOLD CORP., Lodi, Calif., has brought out a compact steam generator which needs only to be connected to fuel and water lines for automatic operation. A new principle of water feeding, incorporating jet control, furnishes feed water in direct proportion to the amount of steam drawn off, automatically and without the use of thermostats or motor driven pumps.

This boiler operates on either oil or gas fuel. Control of the fuel supply is automatic once the generator has been lighted, depending upon the steam throttle valve or the load. There are only three moving parts in this steam generator.



Automatically operated steam generator available in sizes from 10 to 70 boiler horsepower.

Models are available from 10 to 70 hp. It is said that the 10 hp. model will develop 150 lb. pressure from a cold start in less than five minutes. The design is said to be free from the hazard of explosion because the steam is carried entirely in an overlapping continuous coil, tested to 1,000 lb. pressure. In installation, no pit is required and no fireboxes or electrical connections are needed.

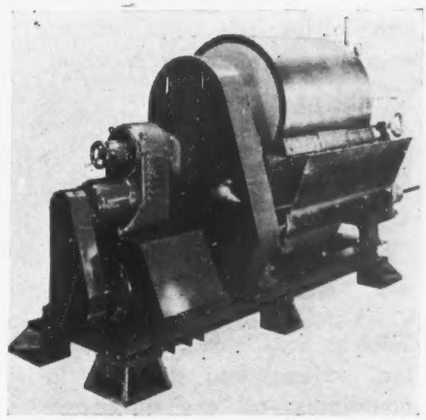
Drum Dehydrater

YEAST PROCESSING EQUIPMENT CORPORATION, 7001 North Clark Street, Chicago, has developed dehydrating equipment of the single drum atmospheric type. This dehydrater is said to be fully automatic and to be designed for high efficiency operation. It is also said to be designed particularly for retaining the vitamin content of the food products being dried on it.

The dehydrater consists of a drum supported by trunnions on roller bearings which rest on rigid cast iron frames. The drum is rotated by an electric motor of the splash-proof type, with a built-in variable speed drive.

The product being dried is applied to the drum by means of a sanitary pump, propelled by an individual motor. The food is first pre-heated in a jacketed trough by the condensate discharged from the drum. The thickness of the film applied to the drum can be regulated by means of an equalizer equipped with a micrometer screw drive.

After drying, the product is removed from the drum by means of flexible steel knives and is discharged into a conveyor trough equipped with a cooling jacket. Where desired, a pulverizer is installed to reduce the dried materials to the desired degree of fineness.



Dehydrater of the single drum atmospheric type.

Plant Ventilators

CARRIER CORP., Syracuse, N. Y., has brought out a series of factory building ventilators particularly for use where blackouts are necessary. Designed to present transmission and reflection of illumination from the building interior or reflection of light from the night sky, these ventilators are available in three types as follows: (1) Exhaust ventilators, to remove hot humid air from the plant, exhausting it at the roof; (2) supply ventilators, to replace the excessively hot plant air with relatively cooler air from outdoors, drawing the air in at the roof and supplying it

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FERRY CONTINUOUS POTATO CHIP MACHINES

Slicing, washing, frying, drying, salting and delivery to containers—all are automatic and continuous, with the result that the chips are uniformily better, all day and every day. None are underdone, burnt, rancid or greasy, and they cost you much less per pound to produce than by any other method . . . Be the first in your territory to adopt and cash in on the FERRY METHOD . . . Made in 6 sizes with capacities from 50 to 350 lbs. of finished chips per hour.

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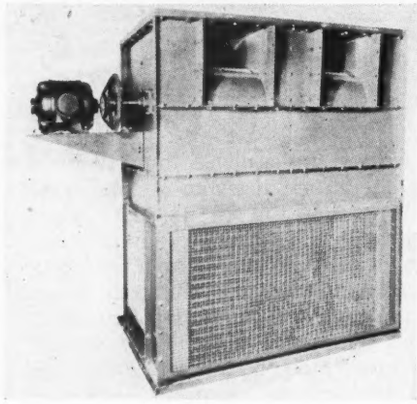
with uniform circulation to the work areas; (3) tempering ventilators, which warm and deliver air to the plant, drawing the air in at the roof and providing needed ventilation with temperate air to prevent drafts and cold spots during cold weather. Each of these types comes in three standard capacities: 10,000 cu. ft. per minute; 15,000 cu. ft. per minute and 20,000 cu. ft. per minute. The units may be used singly or in multiple.

Refrigeration Unit

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa., has brought out three new factory-built type AVL industrial refrigeration units for product cooling rooms. These units are available, complete, in a compact cabinet, and in sizes from 2½ to 15 tons of refrigeration each. The fans included in the unit



Refrigeration unit developed for cooling product storage room.

range in capacity from 3,000 to 13,000 cu.ft. per minute. The units have been particularly designed for refrigeration application in fruit, vegetable and meat storage rooms.

Coupling Head Thermoswitch

FENWAL, INC., Ashland, Mass., recently introduced a coupling head thermoswitch designed for insertion into a closed liquid or gas system by means of a ½-in. standard pipe thread. This switch should be used only where the medium with which it is in contact is not corrosive. Applications of this switch include such equipment as sterilizers and pasteurizers, also instantaneous water heaters. The switches come with an adjustable operating range of -50 to 400 deg. F., and with contact ratings of 10 amp. at 150 volts or 5 amp. at 230 volts a.c. Special switches for higher temperatures can be furnished. The advantage of the coupling head design is that it facilitates permanent wiring connections.

Photoelectric Reflection Meter

PHOTOVOLT CORPORATION, 95 Madison Ave., New York, recently brought out two models of photoelectric reflection meters for the measurement of reflectance and color. They can be applied in measuring the reflectance and color of solid surfaces, pastes, powders and opaque liquids. Model 600 operates from two dry cell batteries which are housed in instrument casings, while Model 610 operates from an ordinary a.c. lighting circuit. The first of these models is recommended where general reflectance is to be measured and when the instrument is to be taken about from place to place where current is not readily available. The Model 610 has the advantage that it is usable with more selective color filters, that it has higher sensitivity and that it registers dispersed reflection without responding to specular gloss.

Among the applications of these instruments in the food field are measurements of the "whiteness" of flour and milk; measurements of the color of food products such as baking powder, butter, cheese and extracts; and in color matching.

Pallet Conserves Steel

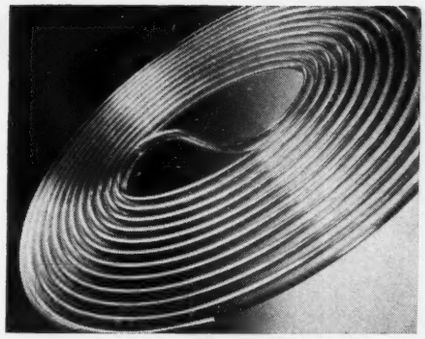
UNION METAL MFG. CO., Canton, Ohio, has introduced a new type of pallet or skid platform for material handling installations which is specially designed to conserve steel. It consists of a top and bottom of wooden slats, reinforced with steel at the ends and in the center. Bolted construction permits easy replacement of the wooden slats, while the steel ends protect the pallet from damage by power fork trucks. In

Pallet with wood top and bottom conserves steel.

this way it is said that scarce metals are conserved without sacrificing strength, usefulness or ease of handling. The new pallets are available in all sizes to meet ordinary material handling requirements.

Plastic Coils

NORTH PENN CO., 72 Fifth Ave., New York City, is now distributing coils and straight lengths of transparent plastic pipe of seamless type made by Extruded Plastics, Inc., of Norwalk, Conn., out



Cooling coil made from transparent plastic pipe.

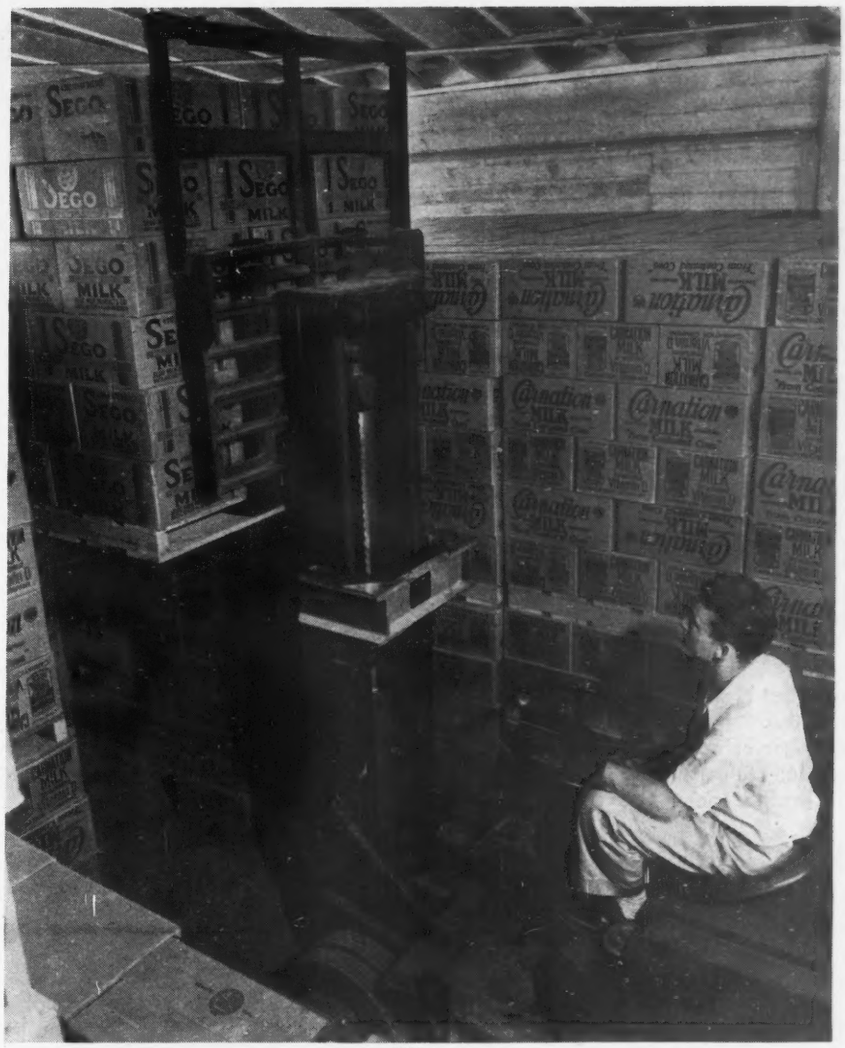
of "Tenite," a transparent plastic material produced by the Tennessee Eastman Corp. of Kingsport, Tenn. This pipe is particularly recommended for cooling beverages and other installations, where, for instance, it may replace block-tin piping formerly used. It can be readily formed into spiral and flat coils such as are used in ice cooling systems. Its transparency allows the full length of the pipe to be observed so that any obstruction which may occur in the line can be readily located, and so that it is simpler to keep the pipe clean and sanitary. The inside surface is perfectly smooth and is said to be more uniform than similar pipes on the market. This transparent piping can be used in conjunction with present standard connections and fittings, such as those supplied for beer piping.

New Portable Utility Conveyor

LAMSON CORPORATION, Syracuse, N. Y., has brought out Model CM adjustable utility belt conveyor. This conveyor is of portable type and has a total length of 11 ft. The belt is 14 in. wide and operates at approximately 60 ft. per min. The capacity, maximum live load, is 100 lb. or 600 lb. per min. The drive is through a ½ hp. single-phase, 60 cycle a.c. motor and a flexible cord for connecting is provided. Six inch diameter swivel type casters are provided on the carriage for easy movement and there are two wheel locks. Applications of this conveyor include the piling of cartons, bags and boxes and the unloading and loading of miscellaneous loads in warehouses and storerooms.

Steel-Condenser Unit Heater

MODINE MFG. CO., Racine, Wis., has brought out its "Style S/S" line of unit heaters employing steel in place of the copper or copper alloy formerly used. In order to reduce the hazard of internal and external corrosion, which would be encountered with steel, "ingot iron" is used for condenser tubes and headers,



How to Condense Evaporated Milk

First, put lots of cartons on one pallet. Second, pick up the whole batch as a unit load and carry it to storage. Third, stack the whole she-bang waaaaay up. Repeat until you have the right amount in the right space.

This "condensation" process certainly enables you to concentrate more milk in less space. Moreover it saves time and manpower and cuts costs tremendously. Adaptable? Absolutely . . . it's being used on everything from soup to nuts.

And best of all it requires a minimum of equipment . . . just Towmotor, the "one man gang" that picks up 1000 to 10,000-pound loads . . . moves them as fast as 10 miles an hour . . . stacks them as high as 25 feet. If you'd like to learn more about this economical lift truck, ask for a free copy of "The Inside Story." Just write Towmotor Company, 1222 East 152nd Street, Cleveland, Ohio.

TOWMOTOR

ARMY-NAVY E

THE 24-HOUR ONE-MAN-GANG

as this is more resistant to corrosion than ordinary steel. Tubes are of extra heavy wall thickness with the steel fins permanently bonded to the outside to prevent corrosion at the point of contact. An additional feature to prevent corrosion is the fact that after complete assembly of the condensers and fins, the assembly is dipped in a lead alloy bath.

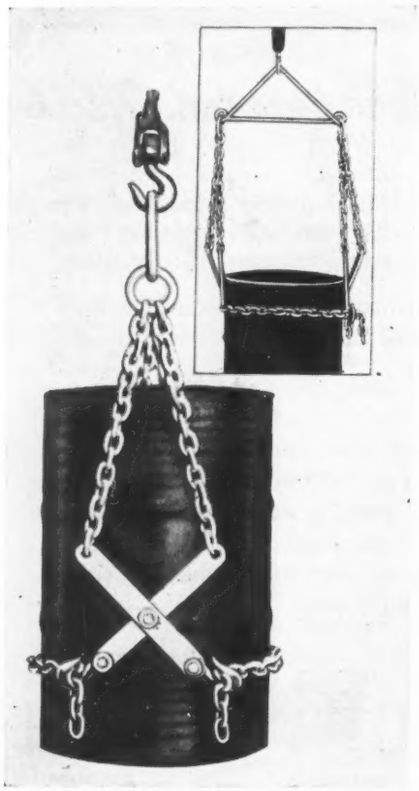
This new line of unit heaters is available in both horizontal and vertical delivery types.

Ultra Violet Unit for Food Industries

PFALTZ & BAUER, INC., Empire State Building, New York, is offering a new pure fuzed quartz ultra violet generator of high intensity, specifically designed for the examination of food products to determine purity and origin. Among the products with which this generator can be used are butter, margarine, eggs, egg products, lard, fermented liquids, sugar and oils. It is also useful for the study of preservatives and for the ultra violet irradiation of food products for the control of air-borne bacteria and surface molds.

Barrel Grab

PALMER-SHILE COMPANY, 7124 Jefferson Avenue, Detroit, Mich., has brought out a "Barrel Grab" for use in picking up any type of steel or wooden barrel, box or container from 40 in. in diameter down to the size of a small nail keg.

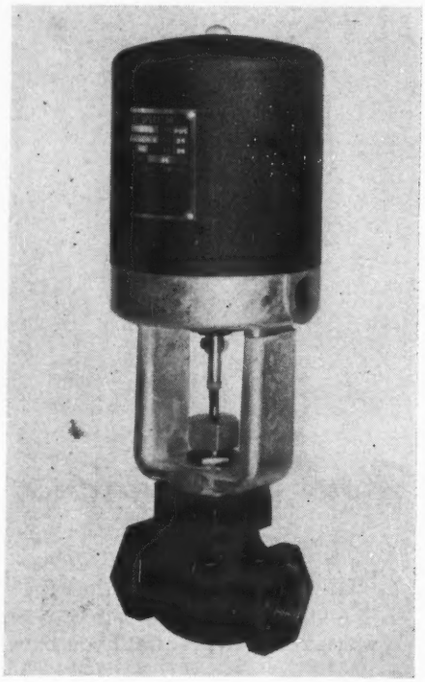


Barrel grab for lifting steel or wooden barrels.

The capacity of this device is up to 2,000 pounds. It is made with a ½ in. by 2 in. flat bar stock toggle and a pivoting pin of 1 in. diameter cold-rolled steel. The chain is ⅜ inch stock, while the spacer and hoisting bar is made of ¾ in. diameter cold-rolled steel.

Motor Operated Valve

BARBER-COLMAN CO., Rockford, Ill., has brought out a line of direct current motor operated valves designed for two-position (on-off) control of steam, water or gas. The majority of types available may also be used for oil or brine. The valves are suitable for use on heating and cooling coils, bottle washers, humidifiers, [illegible] water storage tanks and similar installations.

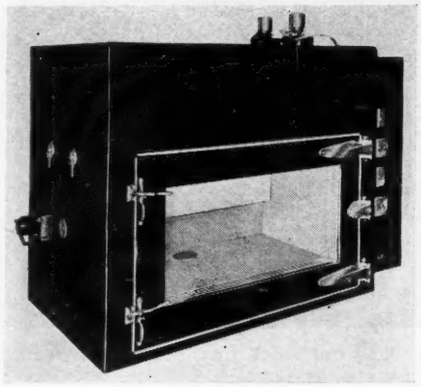


Heavy duty direct current motor operated valve.

In construction, this motor operated line of valves are for heavy duty industrial applications. They are powered by ball bearing Eicor series wound direct current motors. All motor parts are corrosion proof. Control is from a single pole double throw switch or its equivalent, such as a thermostat, pressure switch, float switch or relay. The unit may be mounted in any position.

Testing Cabinet

FOR such operations as the testing of instruments under conditions of heat or cold, American Coils, Inc., Newark, N. J., has brought out a testing chamber with a range of operating temperatures extending from −55 deg. C. to +70 deg. C. Included with this chamber is the apparatus for refrigerating and heating.



Low and high temperature testing chamber.

The model shown in the illustration, known as Model RTC-1, consists of a two-stage condensing unit, a heat exchanger, a liquid sub-cooler, a coil or evaporator, expansion valve, cabinet and forced draft strip electric heater, along with thermostat and other controls and connections for each. The entire operation of this model is completely controlled from a front panelboard where the master switch is located along with the fan control, light switch and receptacle switch. The cabinet occupies a space 83 in. wide by 56½ in. high by 42 in. deep. The interior is 59 in. by 28 in. by 30 in. with a cubic content of 28.7 cu.ft. The insulation is made up of 6 in. of Fiberglas. A door is provided with five glasses sealed and dehydrated against passage of moisture, with a visible opening 46 in. wide by 21½ in. high, so that instruments under test can be observed from outside.

Packaging Foil

CHROMIUM CORPORATION OF AMERICA, Waterbury, Conn., has produced, on a small scale, foil made of pure nickel. The new foil, which is produced by electrolysis, is at present obtainable in widths up to 16 in., in thicknesses from 0.00025 in. to 0.0015 in., and in indefinite lengths.

The foil as produced is stiff but is not brittle. In this condition it will stand moderate deformation, but it can be annealed when a softer material is desired. The foil can be welded or soldered and it can be laminated to wood, plastic or other materials. Because of the chemical and physical properties of nickel, it is expected that this new material will find useful application as a lining for containers and as a wrapping in packaging of food products, as well as for many other uses.

The manufacturer states that small specimens suitable for experimental purposes are available upon request.

Questions & Answers

Why We Are Publishing Questions and Answers

For many years, the editors of FOOD INDUSTRIES have been writing two magazines. One of these is the printed magazine, with which all of our readers are familiar. The other consists of answers to letters of inquiry that come to the publication day after day.

Many of these inquiries duplicate other questions that our readers ask, showing widespread interest in the subject. Others are thought provoking, and should serve to stimulate progress in food processing. Still other questions cannot be completely answered by the editors, although there are undoubtedly some among our readers who can answer them fully.

For these reasons, it has been decided that, beginning with this number, a selection of these questions and answers will be published in FOOD INDUSTRIES. When subscribers make inquiry, they will be answered directly by mail as heretofore. Subsequently, a selection from their questions and answers, also from those of nonsubscribers, will be printed. In each case, the questioner will not be identified.

When readers are able to throw additional light on any topic that is discussed, it is hoped that they will send in their answers for publication.—THE EDITORS.

Conversion

A wine-bottling firm in the Middle West is interested in converting their facilities to war industry.

Recent articles in FOOD INDUSTRIES have covered the general phases of conversion, with illustrations from many fields. Each specific inquiry should be sent to the Conversion Section of the Food Branch of the War Production Board, Washington, D. C. Government requirements are considered confidential information, and it is therefore the policy of this agency to send a representative to look over the plant situation when reported facilities seem to be of interest.

Bottle Tops

A manufacturer in Cuba wants "full documentation" on plastic tops for carbonated beverage bottles. We have had similar inquiries from New Zealand and from Australia.

Plastic tops for carbonated beverage bottles are not possible in the United States because of the shortage of chemicals that go into the synthetic plastic. There are rumors that some firms expect to come out with molded tops for glass containers, to be made from noncritical materials. For pressure goods such as carbonated beverages, it is the belief of our staff that plastics will not be permitted.

One way for users of crown caps in this country to get by is to recover old crowns. Some manufacturers are getting them back, cleaning them out and removing the old lining, washing, drying, reforming and then relining with fresh cork liners. Information on the methods used has not been made public. And there are those in the industry who refuse to have anything at all to do with it, on the ground that it is bad for business.

There is very little that can be given in the way of honest encouragement.

Pectin Packing

A Canadian reader reports that he is anxious to learn the exact commercial procedure for handling pectin in barrels. He understands that SO_2 is used but does not know the proportion.

Practice in the United States at the present time is to pack this material in 5-gal. containers, No. 10 tins, or glass bottles for consumer use. The containers are filled hot, immediately sealed and processed for sterilization just as in ordinary canning or glass packing. No preservative is used.

Because of the well-known attitude of the Food and Drug Administration towards the use of sulphur dioxide in the preservation of foods, it does not seem that the method suggested by this inquirer would be permissible in this country for edible products.

Soup Mixes

A Canadian wholesale grocery-supply firm wants information about dry soup mixes, especially the type of stock used.

An inspection of the labels of dehydrated soup mixtures prepared in the United States will disclose all of the ingredients except the identity of the individual spices and herbs.

Most of these dehydrated soup mixes are flavored with a vegetable-protein derivative, generally monosodium glutamate. This or a similar flavoring is used in place of meat because of better keeping qualities. The chicken-noodle variety is flavored with chicken fat, which is generally packed in a separate container within the main container.

The exact formula used depends on many factors. You will have to experiment or hire a consulting laboratory.

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FOOD PLANT EQUIPMENT

Bottle Washing—A descriptive folder discussing "Relion" and its use in the washing of bottles, has been issued by the Diversey Corp., 53 W. Jackson Blvd., Chicago.

Dehydration Equipment—A continuous type tunnel dehydrater for the dehydration of such foods as vegetables and meats is briefly described and pictured in four-page Bulletin No. 280, published by Proctor & Schwartz, Inc., 7th St. & Tabor Road, Philadelphia, Pa.

Drying Equipment—The use of near infrared rays for baking, drying and dehydrating operations is illustrated and described in a 32-page bulletin published by the Fostoria Pressed Steel Corp., Fostoria, Ohio.

Materials Handling—"Modern Materials Handling Magic" is the title of an illustrated booklet describing how various handling problems have been solved in industrial plants, illustrated by photographs of the installation, and published by Reading Chain & Block Corp., 2100 Adams St., Reading Pa.

Process Equipment—Latest developments in the "Unique" line of mixers, sifters, cutters, crushers, grinders and similar equipment are described and illustrated in Bulletin No. 300, issued by Robinson Mfg. Co., 30 Church St., New York.

Spray Drying Equipment—Equipment for the dehydration of milk, eggs, vegetable and fruit products dried in a powdered form is described in a catalog published by Drying & Concentrating Co., 332 S. Michigan Blvd., Chicago, Ill.

PLANT SUPPLIES

Chemicals—A complete catalog of the chemicals which it manufactures, including general information and specifications for each chemical, has been issued as a 170-page loose-leaf catalog by Monsanto Chemical Co., 1700 S. Second St., St. Louis, Mo.

Floors—Floors of various types, including acid-proof floors and floors to resist the action of such products as sugar solutions, fats, oils, greases, fruits, milk and milk products, are described, together with information on the reconditioning of old floors, in a recent bulletin of Kayel Engineering Corp., 211 Sussex Ave., Newark, N. J.

Speed Reducers—A catalog of "American" reduction drives, in sizes from ½ to 25 hp., with standard ratios of 13 to 1, delivering any desired driven speed from 11 to 154 r.p.m., has been issued as Catalog R-42, by American Pulley Co., 4200 Wissahickon Ave., Philadelphia, Pa.

Valves and Fittings—Allowable working pressures, for use in various types of valves and fittings shown in Catalog K, are given in Bulletin No. 192-A, issued by Frick Co., Waynesboro, Pa.

Water Treatment—Equipment for the hot process method of water softening is described and illustrated by means of a large cross-sectional line drawing in Bulletin W-212-B2, published by Worthington Pump and Machinery Corp., Harrison, N. J.

CONTROL EQUIPMENT

Control Instrument—A six-page bulletin, interpreting the recently amended WPB Conservation Order L-134 as it applies to the use of thermocouples and thermocouple protecting tubes for pyrometric temperature measuring instruments, has been issued by Wheelco Instruments Co., 846 W. Harrison St., Chicago.

Operation-time Recorders—A bulletin explaining the application of operation-time recorders to various processes in industry, and giving diagrams of typical installations for various kinds of work, for both the electric-operated and mechanical types, has been issued as Bulletin A-321 by the Foxboro Co., Foxboro, Mass.

MISCELLANEOUS

Cleaning Dairy Equipment—A reprint of an article by Lewis Shere, from the June and July, 1942, issues of FOOD INDUSTRIES, entitled "How to Prevent and Remove Milk Deposits," has been issued as Technical Bulletin No. 372, by The Diversey Corp., 53 West Jackson Blvd., Chicago.

Equipment Cleaning—A 24-page "De-Scaling" manual describing methods for the safe and effective removal of scale, rust and similar deposits from water-cooled, steam-jacketed or other processing equipment, has been issued by Oakite Products, Inc., 26G Thames St., New York.

Equipment Use—"Keep 'Em Working" is the title of a new book discussing how to get the most out of such equipment as diesel engines, generators and tractors, a 48-page illustrated manual published by Caterpillar Tractor Co., Peoria, Ill.

Extruded Plastics—A 14-page illustrated booklet giving information on various uses of extruded industrial plastics has been issued by R. D. Werner Co., Inc., 380 Second Ave., New York.

Heat Transfer Data—A 16-page data book including information in formulas for determining overall heat transfer rates, the various factors influencing heat transfer through metallic walls, and the thermal conductivity of metals and alloys commonly used in the construction of process equipment, has been prepared by the development and research division, International Nickel Co., 67 Wall St., New York.

Industrial Plant Sites—An illustrated survey of Central Wyoming, including descriptions of the resources of this region for manufacturing and industry, has been compiled by the Casper, Wyo. Chamber of Commerce.

Materials Testing—Descriptions of various laboratory testing methods for determining the physical and chemical properties of materials, together with 50 pages of conversion tables and specification standards are contained in a 106-page book entitled "Testing in Modern Industry," published by United States Testing Co., Hoboken, N. J.

Mildew Proofing—A price list for Protela S. B., a product for mildew proofing of burlap bags, which is non-toxic and non-inflammable, has been issued by Albi Chemical Corporation, 9 Park Place, New York.

Motors Under War Conditions—Motor fitness requirements, including such subjects as how to get the most service out of old and new motors, switching motors from one job to another, and equipping old machines with new motors, are covered in a 40-page illustrated bulletin, GED-1017, published by General Electric Co., Schenectady, N. Y.

Plant Construction—A 118-page illustrated catalog, showing all types of industrial plants, including many in the food industries, profusely illustrated with photographs of these buildings, has been issued by Lockwood-Greene Engineers, Inc., 10 Rockefeller Plaza, New York City.

Steam Trap Maintenance—"Service Guide" is the name of an eight-page handy booklet on the maintenance and conservation of steam traps, published by Armstrong Machine Works, Three Rivers, Mich.

Valve Maintenance—"How to Repair Valves" is the title of a brief illustrated bulletin giving pointers on valve maintenance, published by Crane Co., 836 S. Michigan Ave., Chicago, Ill.

BOOKS

Protecting Foods from Gas

WAR GASES AND FOODSTUFFS. By W. R. Wooldridge. Published by Leonard Hill, Ltd., 17 Stratford, Place, London, W. 1, England. 1942. 50 pages; 5¼x8¼ in.; paper. Price, 2s. 6d.

The world hopes that the publication of this book will go down in history as unnecessary effort, but until the war is won there can be no certainty that war gas will not be used against the Allies. And in event it is, the information in this work may be of great value in protecting foods and in reclaiming contaminated products.

Based upon British work, which has been quite extensive in this field, the book is not only authoritative but is practical in its treatment of the subject. Beginning with a chapter on the properties of war gases, the author discusses the protection of foodstuffs from gas, factors affecting the degree of contamination, decontamination, contaminated foodstuffs and their salvage, the Contaminated Food Service and detection of gas in foodstuffs.

Nutritional Data

NUTRITIONAL CHARTS. Eleventh Edition. Published by H. J. Heinz Co., Pittsburgh, Pa., 1942. 43 pages; 12x9 in.; paper. Free.

Prepared for dietetic specialists and physicians, the 20 tables in this publication give extensive data on the vitamin and mineral contents of different foods. Also included are tables giving the composition of foods, the nutritional characteristics of important food classes, and the biological properties of vitamins.

Treatise on Vitamins

CHEMISTRY AND PHYSIOLOGY OF THE VITAMINS. By H. R. Rosenberg. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y. 1942. 674 pages; 6¼x9¼ in.; cloth. Price, $12.

Publication of this book provides the technologist with a great amount of fundamental information about the chemistry and physiology of vitamins, information which is well organized by logical classification and which is effectively presented.

In the separate chapters on the various vitamins, the author leads off with a review of the nomenclature and a tabulation of the historical development, followed by information on the occurrence of the vitamin. Then the chemistry and physiology of the vitamins are discussed, procedures for isolating the vitamins are given, and proof of the chemical constitution and synthesis are reviewed. Special paragraphs cover the industrial preparation of the vitamins and their biogenesis. Chemical, physical, biochemical and biological methods of vitamin determination are discussed, as are vitamin standards. Vitamin requirements are stated, and the book ends with a useful list and abstracts of vitamin patents issued in this country and in Great Britain, Germany and France.

Digestibility of Milks

DIGESTION CHARACTERISTICS OF VARIOUS TYPES OF MILK COMPARED WITH HUMAN MILK. Bulletin 428 published by Pennsylvania State College Agricultural Experiment Station, State College, Pa., 1942. 18 pages; 6x9 in.; paper. Free.

Findings reported by the investigators at Pennsylvania State College indicate that lactic acid milk, or buttermilk, evaporated milk and superheated soft-curd milk exhibit excellent digestibility characteristics. And it is believed that these can be used in feeding infants with a minimum of difficulty. These and other conclusions are given in the bulletin, together with a description of how the determinations were made and bar charts showing the comparative digestibility of various types of milk.

Data on Fats and Oils

ANIMAL AND VEGETABLE FATS AND OILS. Published by the U. S. Department of Commerce, 1942. 27 pages; 5¾x9¼ in.; paper. Price, 10 cents; for sale by Superintendent of Documents, Washington, D. C.

With fats and oils made scarce by the war, statistics on production, consumption, stocks, imports and exports for each important animal and vegetable fat or oil are of value to those in the food industries using or producing these commodities. The latest statistics available, covering the period from 1937 to 1941, are presented in this bulletin.

Animal Health

KEEPING LIVESTOCK HEALTHY. Published as Yearbook of Agriculture, 1942, by the U. S. Department of Agriculture. 1276 pages, cloth. Price, $1.75.

This is a comprehensive reference volume intended to stimulate all divisions of agriculture toward better animal husbandry and animal supply for food, fiber and byproducts. Various chapters are by specialists in the Department, presenting scientific information and recommendations regarding disease or pest control.

Any agency in the food industries interested in supply of animals or animal products as a raw material can well have this reference book available. Many of the chapters are very readable reviews which will give a comprehensive understanding of principles and stimulate sound thinking for the industrialist or research man.

Light on Glass Finishes

STANDARDIZATION OF GLASS FINISHES. By T. L. Taliaferro. Published by Phoenix Metal Cap Co., 2444 West 16th St., Chicago, Ill. 1942. 40 pages; 6x9 in.; cloth. Free.

Something of the history of the standardization of glass finishes is given in this little book. But of more interest, perhaps, are the illustrations made by a photographic process to show correct and incorrect fits of closures and glass threads. These help to explain why some closures are too difficult to unscrew and why others seem to be tightly closed when in fact they do not effect a good seal.

Food-Control Methods

FOOD CONTROL IN GREAT BRITAIN. Published by International Labour Office, Montreal, Canada. Distributed in the United States by the publisher's Washington branch, 734 Jackson Place, Washington, D. C. 272 pages; 6x9¼ in., paper. Price, $1.25.

Those concerned with the practical management of this country's food problems during the war emergency will find this book of value, because it reports British experience with similar problems. While conditions in England and the United States are not the same, many of the "mechanisms" and agencies for handling the problems are parallel.

Advice about Apples

HANDLING APPLES FROM TREE TO TABLE. By D. F. Fisher. Published by the U. S. Department of Agriculture, Washington, D. C., 1942. (Circular No. 659.) 38 pages; 6x9¼ in.; paper. Price, 15 cents; for sale by Superintendent of Documents, Washington, D. C.

Practical facts are presented in this publication which will help apple packers and distributors to reduce quality deterioration in apples between tree and table. And with wartime food shortages ahead, this becomes particularly important. The circular tells when to pick and when to pack the fruit. It gives the factors affecting storage, discussing storage temperatures, gas storage, atmospheric humidity and fungus diseases.

PATENTS

Pitted Cherries Graded by Treatment With Solution of Suitable Density to Float Those With Sealed Air Pockets—Burton C. Coons, to Food Machinery Corp., San Jose, Calif. No. 2,300,777. Nov. 3, 1942.

Beer Packaged in Enamel-lined Double-wall Metal Barrel—Erik G. Nyberg, to A. O. Smith Corp., Milwaukee, Wis. No. 2,301,-075. Nov. 3, 1942.

Gelatine Made From Commercially Dried Rabbit Skin Shreds—Rene Billaudot, New York, N. Y. No. 2,301,242. Nov. 10, 1942.

Chewing Gum Base Comprised of Hydrogenated Rosin—Jacob M. Schantz, to Hercules Powder Co., Wilmington, Del. No. 2,301,331. Nov. 10, 1942.

Yeast Mechanically Emulsified Under Pressure in Closed Mixing Chamber—Earl O. Schnetz, Sacramento, Calif. No. 2,301,461. Nov. 10, 1942.

"Skinless" Sausages Trademarked by Penetration of Water-soluble Ink Through Temporary Cellulose Casing—Louis J. Menges, St. Louis, Mo. No. 2,301,564. Nov. 10, 1942.

Wheat-flour Doughs Given Increased Rate of Flow and Goods Made From Them Given Increased Tenderness and Shortness by Addition of Small Quantity of Corn Gluten—Theodore J. Otterbacher, Zion, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,301,745. Nov. 10, 1942.

Fruit and Vegetable Juices Extracted in Closed System Designed to Permit Sweeping Out of Atmospheric Oxygen by Inert Gas and Collecting of Seeds in Special Chamber—Ronald B. McKinnis, to Sunshine Foods, Inc., Winter Haven, Fla. No. 2,301,-901. Nov. 10, 1942.

Eggs Cleaned During Passage Through Tank Equipped With Opposed Brushes and Endless Conveyor—Roy Stanley Davis, Otsego, Mich. No. 2,301,931. Nov. 17, 1942.

Cheeses Aged in Large Mass Preliminary to Dividing Into Small Units and Covering With Protective Coating—Hubert Fassbender, Kaukauna, Wis., to Milprint, Inc., Milwaukee, Wis. No. 2,302,200. Nov. 17, 1942.

Nuts Cracked and Shelled by Mechanical Means—Morris Kasser, San Francisco, Calif. No. 2,302,227. Nov. 17, 1942.

Drying Operations Carried on Under High Vacuum at Low Temperature — John Reichel, Wynnewood, and Joseph F. Winkler, Philadelphia, Pa. No. 2,302,253. Nov. 17, 1942.

Stable, Modified-starch Pastes Made by Partially Hydrolyzing Heated Starch Suspensions With Water-soluble Carbamide-Aldehyde Condensate—Sivert N. Glarum, Ardmore, Pa., and Joseph J. Thomas, Springfield, Mass., to Röhm & Haas Co., Philadelphia, Pa. Nos. 2,302,309 and 2,-302,310. Nov. 17, 1942.

Ice Cream Slabs Cut Into Service Units by Manually Operated Mechanical Device—Vernon Layton Hubbard, Denver, Colo. No. 2,302,323. Nov. 17, 1942.

Meat Tenderized by Mechanical Means—Joseph P. Spang, Quincy, Mass., to Cube Steak Machine Co., Inc., Boston, Mass. No. 2,302,398. Nov. 17, 1942.

Peach Halves Diced Into Truncated Pyramidal Pieces by Mechanical Means—Ellsworth W. Carroll, San Carlos, Calif., to S. & W. Fine Foods, Inc., San Francisco, Calif. No. 2,302,419. Nov. 17, 1942.

Liquid Pasteurized in Continuous Manner—Velt C. Patterson, to York Ice Machinery Corp., York, Pa. No. 2,302,469. Nov. 17, 1942.

Poultry Plucked and Cleaned by Mechanical Means—Harold C. Campbell, Ashley, Ohio, to Ashley Machine Co., Piqua, Ohio. No. 2,302,525. Nov. 17, 1942.

Molasses Heated to and Held at Temperature Close to Caramelization Preparatory for Spraying—Benjamin H. Card, Fairwater, Wis. No. 2,302,526. Nov. 17, 1942.

Perishables Packaged and Refrigerated by Placing in Contact With Crushed Ice Which in Turn is Held in Contact with Refrigerant Material of Lower Melting Point Than Crushed Ice—William E. Moore, San Francisco, Calif. No. 2,302,639. Nov. 17, 1942.

Honey and Similar Liquids Heat Treated in Container With Double Bottom—Walter T. Kelley, Paducah, Ky. No. 2,302,652. Nov. 17, 1942.

Chewing Gum Base Made to Contain Polymerized Pinene Resin Saturated With Hydrogen in Presence of Oxide Catalyst—William H. Carmody, Springfield, Ohio, to Carmody Research Laboratories, Inc. No. 2,302,664. Nov. 24, 1942.

Pits Removed From Half Fruit by Mechanical Means — Raymond L. Ewald, Olympia, Wash., to Special Equipment Co., Portland, Ore. No. 2,302,688. Nov. 24, 1942.

Cucumbers Mechanically Pricked Preparatory to Pickling—Charles E. Lang, to C. C. Lang & Son, Inc., Baltimore, Md. No. 2,302,701. Nov. 24, 1942.

Molasses and Phosphatide Product Used as Deterrent to Sludge Formation in Lubricating Oils and to Decrease Their Corrosive Action on Metal Surfaces—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,302,708. Nov. 24, 1942.

Eggs Mechanically Washed on High-production-rate Basis—William Stehlik, one-third to Edward Dickman and one-third to Max Levin, Minneapolis, Minn. No. 2,302,-809. Nov. 24, 1942.

Cut Fish Livers Mixed With Dried Pomace Preparatory to Recovery of Water-soluble Vitamin—Clarence Walter Whitmoyer and William James Moore, to Whitmoyer Laboratories, Inc., Myerstown, Pa. No. 2,302,928. Nov. 24, 1942.

Fats Containing Fatty Acid Radicals of Two or Four Unsaturations Hydrogenated on Continuous Basis With Relatively Little Formation of Isomerized Esters—Marion H. Gwynn, Leonia, N. J. No. 2,302,994. Nov. 24, 1942.

Frozen Confections Stripped From Spur Plates by Mechanical Device—John Wenzl, Jr., Alhambra, Calif., to Joe Lowe Corp., New York, N. Y. No. 2,303,013. Nov. 24, 1942.

Perishable Foods Heated to Sterilizing Temperatures Under Pressure in One Vessel, Dropped Into Second Vessel Without Contact With Outside Air and Cooled to Temperature Slightly Less Than Boiling Point Preparatory to Filling Into Sterilized Paper Containers and Sealing—Carlos Butty, New York, N. Y. No. 2,303,021. Nov. 24, 1942.

Sugars Electrolyzed for Production of Polyhydric Alcohols—Ralph A. Hales, Tamaqua, Pa., to Atlas Powder Co., Wilmington, Del. No. 2,303,210. Nov. 24, 1942.

Onions Mechanically Cleaned and Graded—Henry A. Murray, Garrett, Ind. No. 2,303,222. Nov. 24, 1942.

Liquid Aqueous Licorice Extract Formed Into Relatively Large Solid Mass Having Relatively Dry, Nontacky, Nonadherent Surface Skin—Albert M. Spiegel, Oaklyn, N. J., to MacAndrews & Forbes Co., Camden, N. J. No. 2,303,238. Nov. 24, 1942.

Tamales Mechanically Formed—Joseph A. Gage and Ben Harve Johnson, Dallas, Tex. No. 2,303,351. Dec. 1, 1942.

Ice Cream Cones Protected With Self-sustaining and Form-maintaining Nonedible Conical Wrapper—Sidney Goldberg, Chicago, Ill., to Universal Paper Products Co. No. 2,303,352. Dec. 1, 1942.

Ice Cream Cones Given Protective Shield Which Permits Handling by Mechanical Stacking Device—Walter E. Amberg, Arthur E. Bowes and Stephen W. Amberg, to Universal Paper Products Co., Chicago, Ill. No. 2,303,420. Dec. 1, 1942.

Foods in Predetermined Quantities Heated to Sterilizing Temperatures and Cooled Without Agitation Preparatory to Filing Into Sterilized Cans Fitted With Sterilized Covers and Sealed in Maintained Sterilized Condition.—Charles O. Ball, Mount Vernon, N. Y., to American Can Co., New York, N. Y. No. 2,303,422. Dec. 1, 1942.

OUR SALT carries an umbrella!

Know why an Englishman carries an umbrella? To *keep dry*, of course . . . and today we've developed a practical "umbrella" for Diamond Crystal Salt —to help keep it dry and prevent caking.

Salt cakes when exposed to excessive humidity, because moisture condenses on salt particles, forming a thin layer of brine. Then, in dry weather, the brine evaporates and the crystals knit together.

Our research laboratory has found a number of ways to help prevent salt caking. Removal of moisture-attracting impurities, such as calcium chloride, helps. So does complete removal of fines by careful screening. Most important is to provide salt with a moisture-vapor-resistant package to keep out dampness.

Take our Flour Salt bag, for example. It is composed of three 50-lb. sheets of kraft and two 25-lb. sheets of kraft, laminated together with 40 lbs. of asphalt per ream. That's a lot of asphalt, and it costs us more money—but our moisture-vapor transmission tests show that this bag is well worth the extra cost. The bag is even sewn with *waxed thread* to seal the holes made by the sewing-machine needle. That's *real protection*—one reason we have been able to eliminate caking as a major problem!

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If *you* have a salt problem, write our Director of Technical Service. He will be happy to help! Diamond Crystal Salt, Dept. J-1, St. Clair, Mich.

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Filtrine's thoroughness in *completely* removing rust, sand, clay and vegetable matter from water makes it ideal for food industries. Filtrine lasts a lifetime; changing the filter medium when the saturation point is reached, is only a matter of minutes. There is nothing to get out of order in a Filtrine Filter. It is easily installed, moderately priced and pays big dividends! And for bakers or wherever *cooled* water is required, there is a FILTRINE COOLER designed especially for the job. Wide variety of models—large capacities.

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53 Lexington Ave., Brooklyn, N.Y.

Army Standards For Dehydrated Foods

(*Continued from page 55*)

more than 1 percent by weight of the product may pass through a standard sieve containing 8 meshes to the inch (0.097-in. opening). Not more than 10 percent by weight of Type III, stripped (Julienne style) may be less than 12/16 in. in length.

Rehydration

Dehydrated carrots shall rehydrate in water to approximately their original form within 30 minutes after coming to a boil, shall possess a good, typical color, a good carrot flavor, a tender texture, and shall be free from woodiness.

Dehydrated Cabbage

Dehydrated cabbage shall be of the shredded type, and shall be such of the following varieties as may be specified in the invitation for bids: Green or white, and shall be of the grade indicated.

The cabbage used for dehydration shall be clean, sound, mature and of good cooking quality. The dehydrated product shall be prepared under sanitary conditions and in accordance with best commercial practice. Cabbage of No. 1 grade (except for size) should be used.

Preparation

The cabbage heads shall be properly trimmed to remove the discolored portions, washed to remove soil and foreign material, cored, quartered and either thoroughly sprayed with potable cold water or dipped into a clean 2 percent salt solution. The cabbage shall be cut into shreds not less than 2/16 in. nor more than 4/16 in. in width.

Blanching

The shredded cabbage shall be blanched in live steam for a period of not less than three minutes and until the midribs are translucent throughout and the catalase system has been destroyed. Excessive blanching shall be avoided. A three-minute blanching in live steam will usually be sufficient to destroy the catalase. The blanched material should be dehydrated immediately. In no event shall it be held for more than one hour prior to dehydration.

Dehydration

The temperature and humidity of the air during dehydration shall be such that the product will not be scorched or otherwise damaged. The finishing temperature shall not exceed 150 deg. F. The dehydration surface shall be so loaded as to assure proper air circulation. This load will ordinarily be 1 lb. or less per square foot.

Quality Standards

The dehydrated product shall possess a characteristic color, a good, typical aroma free from hay-like, scorched, musty, or other objectionable odors, and the moisture content of the finished product shall not exceed 4 percent by weight. It shall not contain more than 2 percent by weight of defective pieces. Regardless of the area of the defect, any piece shall be considered defective if it is scorched, bruised, decayed or otherwise discolored in whole or in part, or if it shows evidence of tray blackening or insect damage. The product shall be free from foreign material. Not more than 15 percent by weight of the product may pass through a standard sieve containing 8 meshes to the inch (0.0937-in. opening).

Rehydration

Dehydrated cabbage shall rehydrate to approximately its original form and color within 30 minutes after immersion in water at room temperature. The rehydrated product shall possess a good characteristic color, a good cabbage flavor and a fairly crisp texture.

Dehydrated Onions

Dehydrated onions shall be such of the following types as may be specified in the invitation for bids; Type I, sliced or flaked; Type II, powdered; and shall be of the grade indicated.

The onions used for dehydration shall be clean, sound and mature; of white or yellow variety; of prominent flavor and of good cooking quality. Sweet, mildly flavored varieties, or varieties which yield a bitter flavor shall not be used. The dehydrated product shall be prepared under sanitary conditions and in accordance with best commercial practice. Onions of No. 1 Grade (except for size and shape) should be used.

Preparation

The onions shall be thoroughly washed to remove soil and foreign material and sorted to remove any that are diseased or otherwise damaged. The root bases, tops and outer and discolored scales of the onions shall be removed. The onions shall be cut into slices not less than 2/16 in. nor more than 4/16 in. in thickness. The cut material should be dehydrated immediately, and in no event shall it be held for more than one hour prior to dehydration.

Dehydration

The temperature and humidity of the air during dehydration shall be such that the product will not be scorched, case-hardened or otherwise damaged. The finishing temperature shall not exceed 140 deg. F. The dehydration surface shall be so loaded as to assure proper air circulation. This load will be ordinarily 1¼ lb. or less per square foot.

Quality Standards

The dehydrated product shall possess a uniform characteristic color, a good, typical aroma, free from scorched, musty or other objectionable odors, and the moisture content of the finished product shall not exceed 4 percent by weight. It shall contain not more than 2 percent by weight of defective pieces. Regardless of the area of the defect any piece shall be considered defective if it is discolored in whole or in part (scorched, bruised, decayed or tray blackened). Type I, sliced—not more than 2 percent by weight of the product may pass through a standard sieve containing 8 meshes to the inch (0.097-in. opening). Type II, powdered—the powdered product shall be free-flowing and not more than 2 percent by weight of the product may fail to pass through a standard sieve con-

taining 30 meshes to the inch (0.0232-in. opening). The powdered product shall be practically free from particles of skin.

Rehydration

Type I shall rehydrate in water to approximately its original form within 30 minutes after coming to a boil. The rehydrated product shall possess a good typical color, free from brown, pink or grey stock, and shall have a prominent onion flavor.

Changes in Standards

Several changes have been made in the Quartermaster Corps Tentative Specifications for dehydrated white potatoes, sweet potatoes, rutabagas and beets, issued September 3 and 4 (FOOD INDUSTRIES, November, 1942, page 54).

Under the heading of Packaging for Export, the following changes apply to the four vegetables: The product must be filled into an inner carton having a capacity of at least 5 gal., made with a seal end, a regular slotted, or straight or reverse tuck inner carton of about 13x16½x14 in. outside dimensions, with taped manufacturer's joint so constructed that when closed, the exterior of the carton has no protruding edges or flaps that might damage or chafe the lead-foil envelope into which it is placed. The board used for the carton shall be of solid sulphite or kraft 0.018-in. thick with a No. 4 finish, or having a basis weight of 75 lb. per 1,000 sq.ft., or of solid manila containing at least 65 percent of sulphite or kraft, 0.024-in. thick with a No. 4 finish, or the board shall be made from 0.009-in. corrugated kraft with 0.009-in. kraft liners. The materials used to make and seal the inner carton must be free from objectionable odor. The inner carton shall be closed and the exposed edges sealed with glued No. 1 kraft tape so that the package is absolutely sift proof.

The filled and taped inner carton shall then be placed in a sealed bag or envelope of the following description. A completely sealed envelope composed of No. 1 kraft paper having a minimum substance of 40 lb. (24x36 in.—500) laminated with not less than 15-lb. of asphalt per ream, having a minimum softening point (ASTM D26-36) of 155 deg. F., to a composition lead foil, having a thickness of not less than 0.0009-in., coated on the outside with an adequate thickness of a flexible thermoplastic film other than wax of such a nature as to provide a face to face heat-sealed seam of adequate strength at least ½-in. wide. This laminated sheet shall be formed into a flat envelope by effecting a continuous seal along the side seams and also along the bottom. After the inner carton is inserted, the top of the bag shall be heat-sealed across, first expelling any excess air. The two corners of the seal shall then be folded back over the top of the package. A single strip of bending chipboard not less than 0.018-in. thick with a No. 4 finish cut about ⅛-in. less than the inside width of the outer carton, shall be bent into a U shape and placed so as to cover completely the narrow sides and bottom of the sealed envelope.

The envelope and contents together with the U-shaped strip shall be inserted into a 0.090-in. weatherproof solid-fiber outer carton of approximately 1,200-cu. in. (5-

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Any time-saving or other advantage you can establish in handling sanitation or maintenance routines contributes toward increased output. Listed in panel at right are SEVEN typical jobs where Oakite materials are SPEEDING-UP work with limited manpower. Yes... it is being done for others... we want to help you in the same effective way!

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Steam Cleaning Blanchers, Scalders, Retorts, Cookers

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Ridding Floors of Syrups, Juices, Sugar, Oil, Grease, Etc.

•

De-Scaling Water-Cooled and Water-Circulating Equipment

•

Washing Cans and Jars Before Filling and Labeling

•

Removing Grease, Wax, Scale From Aluminum Trays, Utensils

•

Cleaning Rubber, Stainless Steel and Wire-Mesh Conveyor Belts

OAKITE MATERIALS METHODS SERVICE — Buy Bonds for Victory — CLEANING FOR EVERY CLEANING REQUIREMENT

gal.) capacity. The inside dimensions of the outer carton shall be such that the assembled package described above shall fit snugly into it when closed on the sides, ends, and top and bottom. The manufacturer's joint shall be placed on the narrow side of the outer carton. The carton shall comply with Quartermaster Corps Tentative Specification OQMG No. 12-A, but it need not be steel banded.

Caustic Peeling Method Reduces Waste

(*Continued from page 54*)

varies. There are limits to the length of any one digester. If too short, it does not allow the full effect of the caustic on the potatoes. If too long, then the potatoes need to travel at too high a speed and there is danger of bruising unduly. A good rule in determining the size of the digester is that the holding capacity shall equal the volume of the potatoes per time cycle selected, and the conveyor should travel the length of the digester during the time cycle selected. To illustrate:

A digester 1 ft. wide and 8 ft. long can hold in one layer 48 lb. of potatoes. Dividing this amount by a safety factor of 2, we get a holding capacity of 24 lb. If we select 20 seconds as the reaction time cycle (requiring a 41 percent solution at 265 deg. F. as per Fig. 1) then the conveyor has to travel 24 ft. per minute (8 ft. $\times$ 60 $\div$ 20) and can deliver 72 lb. of potatoes per minute, which equals more than two tons per hour.

If, due to different potato characteristics, the reaction time cycle has to be increased, this will require a decrease in the travel speed and consequently a corresponding reduction in tons per hour input, after the input becomes greater than the safety factor.

In selecting a digester it will be prudent to anticipate the widest fluctuations likely to be encountered and to use in addition a reasonable safety factor. Based on these premises, Fig. 3 will give an indication of the length in feet of the digester needed to produce various tonnages per hour of potatoes having a different reaction time cycle. This chart is calculated on the basis of 4 tons of potatoes per hour input. For greater input the reaction time can be increased by increasing the caustic concentration (Fig. 1) or increasing the width or length of the digester.

A glance at Fig. 3 shows that when the immersion time is over one minute, as is the case now with dilute solutions, the size of the digester assumes real proportions if it is to handle any appreciable tonnage.

After the potatoes come through the digester they must be subjected quickly to cooling, washing and decorticating action, however done. A rotary or squirrel-cage type of washer may be adopted, though there is doubt as to whether it will work well without some important changes.

For this operation the author has designed a hexagon tumbler made of metal having ¾-in. perforations on 1-in. centers, with a holding lip at each end, as indicated in Fig. 4. This tumbler revolves at about 10 r.p.m. and has a strong spray of water in the center.

This type of unit gives a mild grinding action as well as a forward movement. The removal of the peel is very satisfactorily accomplished.

The potatoes from now on, if kept either under a spray of cold water or submerged under cold water, can be trimmed, cut, sliced or diced and are ready for blanching without fear or enzymic discoloration. I have tried solutions of sodium chloride and solutions of citric acid, but I have never found them necessary. Plain cold water will do.

Applicable to Other Products

The principle of quick penetration by means of alkalies here disclosed is also applicable to other root vegetables and to some fruits.

As previously stated, the principal object sought is to show a way of saving some of the tremendous tonnage of potatoes that will otherwise go down the nation's sewers. During this emergency, even though patent protection will be sought on the process and on some of the equipment, American and Allied industry is welcome to use any part of the disclosures made herein, provided that license is obtained in advance of use from the author.

War Demands Call for Quick-Curing Cheese

(*Continued from page 65*)

for two weeks. Then it should be held at 55 deg. F., with a relative humidity of 70 to 85 percent, for two weeks. This affords rapid curing without excessive moisture losses. The cheeses at 55 deg. F. should be turned frequently.

The next procedure is to return the cheese to the 40 deg. F. room for one month. If at this time flavor is lacking, place in a 60 deg. F. room for two weeks before placing in a 34 deg. F. room, in boxes, for storage.

A very desirable spread that approaches the natural quick-cured high-moisture types contains as high as 45 percent moisture and 3 percent of salt. In some cases the moisture is very high. The essential point appears to be at least 2.5 percent of salt. Excellent references to spreads from cheese appear in the literature.[1]

During the past several years the author has assisted the industry in introducing the cheeses described above. Success with these types is being attained in the Middle West and in New York State. There is also a growing demand for information regarding the making of unusual types of foreign cheeses no longer imported. The author is well equipped with technical knowledge and experience to aid in this work.

Reference

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Packaging Requirements For Dehydrated Vegetables

(*Continued from page 52*)

chairman; W. B. Van Arsdel; and H. W. von Loesecke. The writers also thank Theodore A. Schwarz, chief chemist, California Prune and Apricot Growers Association, San Jose, Calif., for suggestions, and also the makers and converters of packaging materials who have supplied the materials tested.

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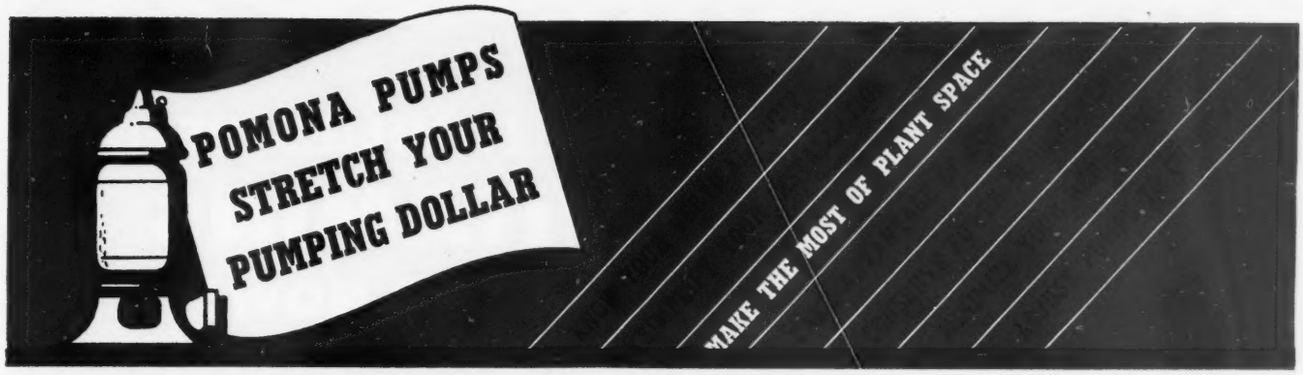

Pomonas Require only a Fraction the Space of Other-type Pumps

SAVE SPACE ON LOCATION: Check over your Pomona installation. It may be that it was simply set into the area occupied by your former pump with little thought given to maximum space utilization. Can you move your Pomona to an out-of-the-way corner—or into a space too small for other equipment—and thus gain added floor space for new equipment?

USE TOP-OF-TANK SPACE NOW WASTED: If your Pomona is not now located over the sump or tank from which it pumps, why not put it there? This space is generally wasted with other-type pumps because of their excessive weight and the difficulty of setting rigid foundations over a sump. But Pomonas need no heavy foundations—in fact, just two timbers anchored across the top of the sump is usually sufficient support for these compact self-balanced pumps. So by relocating your Pomonas over the sump or tank, you can gain solid floor space for other heavy-duty purposes.

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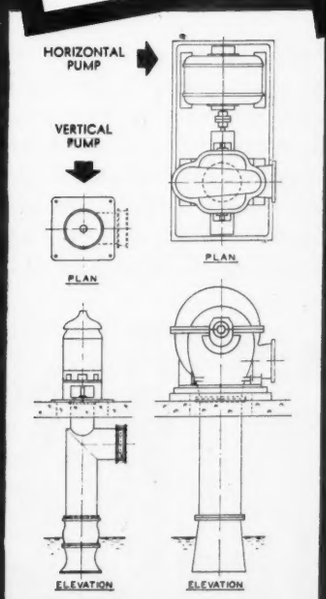
If you are now a Pomona owner, you already know the *many* savings Pomonas have made in your pumping costs. But it may be you can get still greater returns from your Pomona investment by taking fuller advantage of its space-saving compactness . . .

ELIMINATE SPACE-WASTING PIPING: Another important way you can save space with Pomonas is by running all piping either below floor level or overhead, thus leaving the floor space open. You can do this with Pomonas far more easily than with other types because their positive-lift characteristics eliminate need for a fixed level discharge in relation to pump position.

UTILIZE REMOTE LOCATIONS: Still another important space-saving feature of Pomonas is that the impellers are at water level and require no priming to start. This not only eliminates space-consuming priming equipment but—even more important—enables you to place Pomonas at remote out-of-the-way locations and operate them automatically with only infrequent attention. That leaves more floor space free in the center of the plant for equipment that requires the operator's constant attention.



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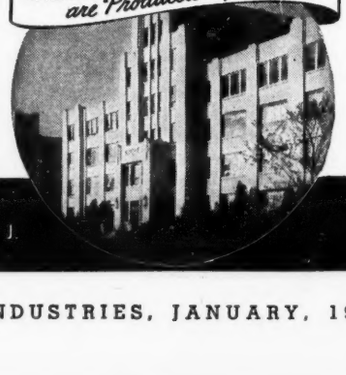

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FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

CEREAL PRODUCTS

Fermentable Corn Sirups

CORN sirups with exceptional fermentability and relatively good resistance to crystallization can be prepared in three ways. One is proportioned blending of final malt conversion products with acid conversion products. Another is controlled α-glucosidase conversion of final malt diastase conversion products. The third is diastatic conversion of corn starch at temperatures below its gelatinization point.

The first method means simply a judicious combination of two starch hydrolysis products, both being easily fermentable. The acid conversion products contain only traces of dextrine and maltose while the malt conversion products contain very little dextrose.

The second method brings out the significant differences between acid action and α-glucosidase action as they affect the more resistant configurations in starch.

The third method provides confirming evidence for the theory that corn starch is molecularly heterogeneous, a considerable portion being more soluble and simpler in constitution than the remainder.

Digest from "Corn Sirups of High Fermentability," by R. W. Kerr, H. Meisel and N. Schink, *Industrial and Engineering Chemistry*, vol. 34, 1232, 1942.

Degree of Cooking

ALKALI number determinations have been investigated to find out if they are suitable to assess the degree of cooking in starch or starchy cereals. Cooking as here considered deals with the very early depolymerization of starch, not chemical or enzymatic hydrolysis.

Critical repetition of the alkali number method reported by Schoch and Jensen in 1942 showed that results are reproducible and that the values have a practical significance.

Application of the method gave values ranging from 7.4 for raw corn starch to almost 30 for a cooked and toasted breakfast cereal. Unprocessed raw starches have the lowest values and the corresponding flours have higher values. All the raw materials tested had values of 17 or under, while the cooked, flaked or toasted products rated 19 or over. The results clearly indicate that some hydrolysis takes place during cooking, and especially during toasting.

The variables associated with cooking are fineness of material, percentage of water in the material to be cooked, time, temperature and pressure. The coarser the material the longer it takes to cook and the lower the alkali number after the material is gelatinized. Starches for cooking tests should be ground to flour fineness. There is an optimum water-starch ratio, and further dilution decreases the final alkali number.

During the cooking, the alkali number rises to a maximum at the point where the mixture is "thoroughly done" and remains practically constant beyond that. For the mixtures reported the maximum alkali number is reached within the first ten minutes of the cooking period. "Precooked" cereals showed no increase in alkali number on subsequent cooking. Higher temperatures, obtained with a pressure cooker, gave no higher values than those obtained at 100 deg. C. with the same mixture.

Digest from "A Method of Determining Degree of Cooking in Cereal Products," by G. H. Benham, *Cereal Chemistry*, vol. 19, 597-605, September, 1942.

ENGINEERING

Refrigeration for Transport at Sea

CANADIAN bacon is being successfully shipped in ordinary cargo vessels by means of refrigerating equipment that can be installed in two or three days in port. Because of the need to avoid delaying the vessel, the prefabricated units have been designed so that they can be handled with regular cargo winches and derricks, and welded in place on the 'tween decks adjacent to one hatch while stowage proceeds through other hatches. Electrical, water and drainage connections are made to the ship's services.

Bacon arrives at quay-side at a temperature of 35 deg. F. or lower. It has been customary to ship in refrigerated space at 30 to 35 deg. F., but scrupulous care in processing the bacon will raise the safe temperature to 45 deg. F. for 30 days. The refrigerating load consists only of heat gain through the sides, bulkheads and decks. Rigid insulation cannot be erected, due to the delay and loss of space involved, but it has been found possible to decrease the heat leakage by use of insulating blankets on the sides and bulkheads.

The authors present a full discussion of the mechanical problems involved and the solutions found.

This is an emergency method for use with a specific product over one particular route, where temperature differences of 20 to 30 deg. F. are sufficient, but experimental work is now underway to extend the system to the transport of frozen cargo. It is suggested that a similar temperature difference would aid in keeping dehydrated products during shipment in the tropics, since many of these now rapidly become inedible at 90 deg. F. but can be kept for relatively extended periods at 70 deg. F.

Digest from "Wartime Refrigeration of Foods for Transport at Sea," by W. H. Cook and T. A. Steeves, *Refrigerating Engineering*, vol. 44, 373-79, December, 1942. Presented by permission of the Ministry of War Transport.

MEATS

Papain Tenderizing

PAPAIN has been used as a meat tenderizer, but the conditions of its use have been largely empirical. The authors have established the influence of various factors on papain activity in the presence of beef.

Although the exact relationship between tenderizing effect and protein breakdown is not known, it was found that as the structure of the meat became softer the digestion of the meat as indicated by chemical tests increased. In this work digestion was followed by measuring the nonprotein digestion products. Survival of papain heated with meat under various conditions was followed by the hemoglobin method.

With a 30-minute digestion period, papain activity increased with temperature up to a maximum at 176 deg. F. and then fell off again rapidly, due to inactivation of the enzyme. The optimum temperature decreases with increase in digestion time. In agreement with this, tenderization of beef is rapid at 131 and 167 deg. F., but at 212 deg. F. the papain is destroyed.

The reaction was much more rapid with ground beef. The enzyme did not appreciably attack a block of beef at room temperature, but ground meat was digested. The rate of proteolysis

was not increased by previous cooking.

The usually recommended procedure for tenderizing is to paint unground beef with papain and then cook. Under such conditions there would be very little penetration and the papain on the surface would be inactivated. Papain can penetrate a solid piece during cooking only when the surface has been softened by digestion at a favorable temperature.

Digest from "Digestion of Beef by Papain," by G. Y. Gottschall and M. W. Kies, *Food Research*, vol. 7, 373-81, September, 1942.

DAIRY PRODUCTS

Bulk Sweetened Condensed Milk

USE of enzyme-converted corn sirup to replace 50 to 100 percent of the sucrose in bulk sweetened condensed milk, whole or skimmed, is practicable, and the product should have normal keeping qualities.

The milk should not be preheated above 185 deg. F. The enzyme-converted corn sirup must be heated separately and drawn into the vacuum pan near the end of the run. When the sirup is added to the milk before preheating there is a marked tendency to thickening and darkening during storage. Separate heating also gives the best flavor.

Storage temperature has a greater effect when the high-conversion corn sirup is used, and unless the milk is to be used within a few days of manufacture it should be stored at 60 deg. F. or less.

Digest from "The Use of Enzyme-Converted Corn Sirup in the Manufacture of Bulk Sweetened Condensed Milk," by P. H. Tracy and G. Edman, *Journal of Dairy Science*, vol. 25, 765-75, September, 1942.

Homogenized Milk

THERE has been a rapid increase in the use of homogenized milk in the United States. Many consumers prefer milk with the fat evenly distributed, and some authorities believe that its soft curd leads to more rapid digestion.

Lowering of curd tension depends on the pressure of homogenizing, 2,500 lb. giving maximum reduction. In the presence of artificial gastric juice homogenized milk forms smaller curds. Proteolysis takes place more rapidly than in raw milk, but after 4 to 5 hours the amount of proteolysis is practically the same for both. This indicates that homogenized milk is more readily but not more completely digested than raw milk.

No significant difference was found in flavor changes during storage, plate count, or development of titratable acidity. It was found that homogenization very markedly reduces the susceptibility to oxidized flavor due to copper contamination and increases the tendency to develop oxidized flavor due to sunlight.

Digest from "Effect of Homogenization on Curd Tension, Digestibility, and Keeping Quality of Milk," by C. J. Babcock, *U. S. Department of Agriculture Technical Bulletin* No. 832, August, 1942.

FRUITS

Darkening Prevented

DILUTE thiosulphate solutions can be used to prevent discolorization of the cut surfaces of fruit and vegetables. The concentrations required are very low, 0.05 to 0.5 percent giving satisfactory results.

The cut pieces are dipped in the solution for ½ to 1 minute or more, after which they may be rinsed in fresh water, if desired, and allowed to dry. In making dried fruit, the pieces are removed from the solution, drained incompletely and then dried as usual.

The process is particularly effective for apples, pears, bananas, apricots, peaches, turnips, onions and mushrooms. Potatoes can also be treated successfully, but they must be used without being allowed to dry.

Sodium thiosulphate is preferred, because it does not impart any objectionable taste or odor to the product treated. The addition of a small amount of sulphite, from 1 to 10 percent of the dry weight of the thiosulphate, will prevent any clouding or precipitation of the thiosulphate solution in contact with air and the cut surfaces of the fruit or vegetables.

Digest from U. S. Patent 2,298,933, issued October 13, 1942, to Eduard Elion, of Larchmont, N. Y.

Spray Residue Removal

APPLE cleaning to eliminate lead and arsenic residues has been investigated by the Department of Agriculture with cooperation of West Virginia and Maryland experiment stations. Comparison of different methods of cleaning under different conditions was made in order to insure elimination of the toxic metal residues so dangerous in food processing.

Both arsenic and lead will be within the required tolerances after washing if controls are used on lead only, since arsenic is removed a little more readily than lead.

The maturity of the apple, the amount of wax on the surface and numerous other factors, including va-

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riety, materially affect the ease of metal elimination. The method of applying insecticides largely determines the quantity of metal residue before washing, but after proper washing in hot acid baths the metal residue is about the same with a given variety of apples, irrespective of the quantity present on the unwashed fruit.

The report presents complete data on the technic and results of washing under a wide variety of conditions.

Digest from "Further Studies on the Removal of Spray Residues from Eastern-Grown Apples," by M. H. Haller and others, U. S. Department of Agriculture, Bureau of Plant Industry, *Technical Bulletin* 828, 1942.

QUALITY CONTROL

Control Methods for Vitamins in Processing

CONTROL of vitamin content during processing has advanced rapidly with the development of chemical, physical and microbiological technics to replace the slower biological methods.

Recognized destructive conditions encountered during processing and storage include heat, oxygen, oxidizing enzymes, unfavorable pH, light, time and moisture. There may also be less well understood effects due to metallic ions, organic catalysts, loosely combined oxygen, loss of natural antioxidants and various enzymatic, bacteriological or mycological processes. Not all the vitamins are susceptible to attack by all of these agents.

In selection of vitamin-assay methods, account must also be taken of the importance of accuracy for label claims and of the biological availability of the vitamin. It is questionable whether a claim for vitamin potency can invariably be based on an analytical estimate of vitamin content since in many cases these methods are not specific for the available form of the vitamin.

The author presents complete charts showing the various steps in recommended control tests—thiochrome for thiamin, a fluorometric method for riboflavin, colorimetric processes for nicotinic acid, ascorbic acid and carotene, and the mercuric chloride method for preformed vitamin A. The relative merits of these and other tests are discussed.

Digest from "Methods for Vitamin Control of Processed Foods," by B. L. Oser, *1942 Proceedings, Institute of Food Technologists*, 59-69.

Vitamin A Retention In Dehydrated Carrots

DURING dehydration of carrots there was a loss of carotene of approximately 6 percent. The dehydrated carrots

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showed good response for provitamin A in bioassay.

The dehydrated product was prepared by the Executive and Operating Committee on Dehydration of the Bureau of Agricultural Chemistry and Engineering, Western Regional Research Laboratory, Albany, Calif.

Chantanay variety carrots were used. The carrots were scraped, cubed and steam-blanched for 2 minutes. Dehydration took 7 hours with initial temperatures of 161 deg. F. dry bulb and 85 deg. F. wet bulb. The finishing temperatures were 140 deg. F. dry bulb and 83 wet bulb. The product was considered satisfactory.

By chromatographic adsorption the carotene content was 101 gamma per gram, which corresponds to 820 gamma per gram on a dry basis. The dehydrated carrots had 722 gamma per gram, equivalent to 773 gamma per gram on a dry basis. The accuracy of determination was about 10 percent on the raw carrots and 5 percent on the dehydrated product.

To determine whether the biological usefulness was preserved to the same extent as the carotene value, weight-response tests on rats were used. It was found that the dehydrated carrots gave a satisfactory weight response, and that the parallelism between chemical determination of carotene and the bioassay value of provitamin A is as good for the dehydrated as for the fresh carrots.

Digest from "Vitamin A Value of Fresh and Dehydrated Carrots," by R. H. Wilson, J. O. Thomas, and F. deEds, *The Fruit Products Journal*, vol. 22, 15-17, 27, September, 1942.

SUGAR

Automatic Control Of Supersaturation

CONTINUOUS recording and control of the degree of supersaturation in sugar-boiling operations is made possible by the discovery that, within the pressure range of the usual sugar-boiling practice, a straight-line relationship exists between the boiling points of sugar solutions of any degree of supersaturation and the corresponding boiling points of water at the same absolute pressures. This is important in controlling the evaporation when sugar is to be recovered in crystalline form. The author presents curves showing this relationship between boiling point and degree of supersaturation. He also gives the principles of design of the recording instrument.

Digest from "Supersaturation in Sugar Boiling Operations: Continuous Automatic Measurement," by A. L. Holven, *Industrial and Engineering Chemistry*, vol. 34, 1234-35, 1942.

VITAMINS

Vitamins in Frozen Vegetables

COMPARATIVE tests were run on eight frozen vegetables, determining thiamin by the different methods. In general the sulphite cleavage modification of the fermentation method, the thiochrome procedure, and bioassay gave good agreement. In cases where the bioassay values are lower, it is suggested that possibly the animal diet used was deficient in other members of the B complex. The sulphite cleavage fermentation method for determining thiamin is recommended.

The values for thiamin, in micrograms per gram, as reported are:

	Bio-assay	Thio-chrome	Fermentation *
Peas	3.64	2.60	2.69
Asparagus	2.11	2.04	2.12
Cut corn	1.20	1.17	1.31
Lima beans	1.17	0.89	0.90
Broccoli	1.06	0.88	0.81
Snap beans	0.76	0.64	0.63
Cauliflower	0.53	0.43	0.39
Spinach	0.52	0.55	0.55

* Fermentation after sulphite cleavage.

Digest from "Determination of Thiamin in Vegetables," by J. C. Meyer and D. K. Tressler, *Industrial and Engineering Chemistry, Analytical Edition*, vol. 14, 788-90, October, 1942.

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Letter To the Editor

About the History Of Refrigerated Storage

To the Editor
of FOOD INDUSTRIES:

I have read the article by G. O. Weddell, which appeared in the September issue of FOOD INDUSTRIES, in which he states, in part: "The first large apple storage installation in the East using a brine spray system with air distribution by means of ducts was that made in 1939 by Consolidated Orchard Co., Paw Paw, W. Va."

Mr. Weddell refers to this storage as having a 50,000-bu. capacity. In 1936, with additional equipment added in 1937 and 1939, Frick Co. installed the same type of equipment for the Reading Cold Storage Co., at Reading, Pa. Their storage has a total capacity of 70,000 bu. In addition to this, our distributors in the Allentown, Pa., district installed brine spray equipment with ducts for the distribution of air in a single storage room having a 24,000-bu. capacity, which work was done for Trexler Orchards. This installation was made in 1937. Trexler Orchards, in addition to having this 24,000-bu. storage, also has a 30,000-bu. storage capacity in four rooms which are refrigerated by direct-expansion cooling coils.—CYRIL LEECH, *Branch Manager, Frick Co., Inc., Philadelphia, Pa.*

Text of Order Appointing Food Administrator

(*Continued from page 46*)

available (or to be made available) for the use of any agency in the exercise of any function transferred or consolidated by subsections a. and b. of this section or for the use of the head of any agency in the exercise of any function so transferred or consolidated, as the Director of the Bureau of the Budget shall determine, shall be transferred for use in connection with the exercise of the function so transferred or consolidated. In determining the amount to be transferred, the Director of the Bureau of the Budget may include an amount to provide for the liquidation of obligations incurred against such balances of appropriations, allocations, or other funds prior to the transfer.

14. Any provision of any Executive Order or proclamation conflicting with this Executive Order is superseded to the extent of such conflict. All prior directives, rules, regulations, orders, and similar instruments heretofore issued by any Federal agency which affect the subject matter of this Executive Order shall continue in full force and effect unless and until withdrawn or superseded by or under the direction of the Secretary under the authority of this Order. Nothing in this Order shall be construed to limit the powers exercised by the Economic Stabilization Director under Executive Order 9250 dated October 3, 1942, as amended. Nothing in this Order shall be construed to limit the power now exercised by the Price Administrator under the Emergency Price Control Act of 1942, Public Law 421, 77th Congress, as amended, or the Act of October 2, 1942, Public Law 729, 77th Congress.

FRANKLIN D. ROOSEVELT
THE WHITE HOUSE,
December 5, 1942.

Brief Summaries Of Grade Standards

(*Continued from page 70*)

ARD frozen spinach possesses a reasonably uniform typical green color, is reasonably free from defects, is reasonably free from excessive leaf stems, possesses a fairly good texture, normal flavor and odor, and scores not less than 70 points.

OFF-GRADE frozen spinach is frozen spinach that fails to meet the requirements of U. S. GRADE B or U. S. EXTRA STANDARD.

The drained weight of frozen spinach is determined after complete thawing under a gentle spray of tap water at a temperature of approximately 68 deg. F., by spreading the thawed spinach over a circular sieve of proper diameter, containing 8 meshes to the inch (0.097-in. perforations), and by allowing to drain for 2 minutes. A sieve 8 in. in diameter is used for 16-oz. size containers or smaller, and a sieve 12 in. in diameter is used for larger containers. The recommended minimum drained weight is not less than 95 percent of the net weight.

The grade of frozen spinach is determined after complete thawing under a gentle spray of tap water at a temperature of approximately 68 deg. F. The flavor and odor of frozen spinach is determined after cooking the spinach in boiling water in an uncovered container for 5 minutes. "Normal flavor and odor" means that the spinach is free from objectionable and off-flavors and odors of any kind. The grade of frozen spinach may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color, absence of defects, and character and texture. The relative importance of each factor has been expressed numerically on a scale of 100.

Color—To receive a rating of 34 to 40 points frozen spinch must possess a practically uniform typical green color. The color must be characteristic of the variety with not more than a slight variation in general green color and with not more than two noticeably brown or darkened leaves or stems for each 16 oz. of net weight.

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you have the proper priority. The major portion of our manufacturing facilities is now devoted to war production. However, we are endeavoring to maintain a complete stock of Tri-Clover Sanitary Fittings and Pumps—in Trialloy, nickel-plated bronze and stainless steel. Essential buyers with proper priority can get delivery. How long we can maintain complete stocks, we don't know. Production of war goods comes first, and will *continue* to come first, in our plants.

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If the frozen spinach possesses a reasonably uniform typical green color a score of 28 to 33 points may be given. "Reasonably uniform typical green color" means that the color is characteristic of the variety, may be variable in general green color, but not to the extent that the appearance is materially affected, with not more than 10 noticeably brown or darkened leaves for each 16 oz. of net weight. Frozen spinach that falls into this classification shall not be graded above U. S. GRADE B or U. S. EXTRA STANDARD, regardless of the total score for the product.

Frozen spinach that fails to meet the color requirements of the paragraph above may be given a score of 0 to 27 points and shall not be graded above OFF-GRADE.

Absence of Defects—The factor of absence of defects refers to the degree of freedom from grit, seed heads, crown and root stubs; from leaves damaged by mildew, insect or similar injury; from harmless extraneous vegetable material (such as grass blades or small weeds); and from mechanical pathological, or other injury.

To receive a rating of 34 to 40 points the frozen spinach must be practically free from defects. To score in this classification the product shall contain no grit. For each 16 oz. of net weight there may be present not more than two leaves damaged by mildew, insect or similar injury; not more than one seed head; not more than one crown and root stub; and not more than an aggregate length of 8 in. of grass and weeds.

If the frozen spinach is reasonably free from defects, a score of 28 to 33 points may be given. To score in this classification the product may contain not more than a trace of grit. "Reasonably free from defects" means that for each 16 oz. of net weight there may be present not more than nine leaves damaged by mildew, insect or similar injury; not more than five seed heads; not more than three crown and root stubs; and not more than an aggregate length of 16 in. of grass and weeds. Frozen spinach that falls into this classification shall not be graded above U. S. GRADE B or U. S. EXTRA STANDARD.

Frozen spinach that fails to meet the requirements of the paragraph above may be given a score of 0 to 27 points and shall not be graded above OFF-GRADE.

Character and Texture—The factor of character and texture refers to the condition and structural characteristics of the spinach leaves and stems and the degree of freedom from excessive leaf stems. The degree of coarseness or stringiness of the stems and vascular system and the tendency of the leaves to break apart, to become shredded or to disintegrate, so that the characteristic forms of the leaves are lost, are considered under this factor. "Leaf stems" are the portions cut from the leaves at the point where the stem, or petiolo, joins the leaf.

To receive a score of 17 to 20 points the frozen spinach must be practically free from excessive leaf stems and possess a good texture. If the frozen spinach is reasonably free from excessive leaf stems and possesses a reasonably good texture, a score of 14 to 16 points may be given. Frozen spinach that indicates a marked, torn, shredded, ragged or perforated condition of the leaves, or frozen spinach that fails to meet the requirements of the above paragraph, may be given a score of 0 to 13 points and shall not be graded above OFF-GRADE.

ISSUED: October 5, 1942
EFFECTIVE: October 15, 1942

Dried Pears
(Tentative)

DRIED PEARS are the halved fruit of the pear tree with external stems and calyx cups completely removed and from which the greater portion of the moisture has been removed. The fruit is sulphured sufficiently to retain a characteristic color. The finished product contains not more than 26 percent moisture by weight.

The various sizes of dried pears are as follows: No. 1 (Jumbo)—1⅞ in. or more in width. No. 2 (Extra Large)—1¾ in. to 1⅞ in. in width. No. 3 (Large)—1½ in. to 1¾ in. in width. No. 4 (Medium)—1⅜ in. to 1½ in. in width. No. 5 (Small)—1⅛ in. to 1⅜ in. No. 6 (Extra Small)—Less than 1⅛ in. in width.

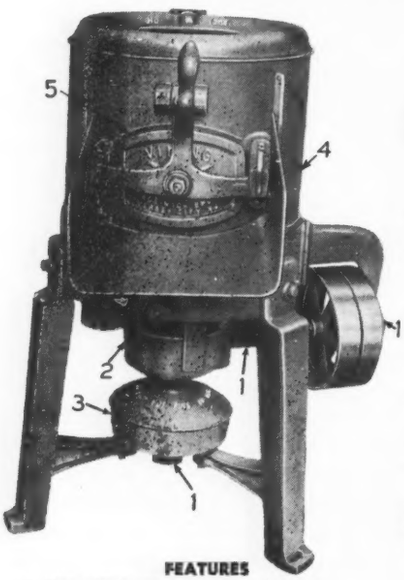
In determining compliance with size requirements listed above, dried pears will be considered as of one size if not more than 10 percent by weight of halves vary from the size range.

U. S. GRADE A or U. S. FANCY dried pears are halves that are well shaped and well colored and are prepared from properly matured fruit. Not more than 7 percent by weight of the dried pears may be affected by russet or similar discoloration or damaged by discoloration, sunburn, hailmarks, limb-rubs, hard end, black end, external stems and calyx cups, scab, disease, insect injury or other defects; not more than 2 percent by weight may be slabs, scraps or broken halves; not more than 3 percent by weight may be immature; not more than 4 percent by weight may be affected by mold, imbedded dirt, insect infestation, decay or other foreign material, of which not more than one-fourth or 1 percent by weight may be affected by decay. The total of all defects mentioned herein, within the limits prescribed above, shall not exceed 10 percent by weight.

U. S. GRADE B or U. S. CHOICE dried pears are halves that are fairly well shaped and well colored and are prepared from properly matured fruit. Not more than 10 percent by weight of the dried pears may be affected by russet or similar discoloration or damaged by discoloration, sunburn, hailmarks, limb-rubs, hard end, black end, external stems and calyx cups, scab, disease, insect injury or other defects; not more than 3 percent by weight may be scabs, scraps or broken halves; not more than 6 percent by weight may be immature; not more than 5 percent by weight may be affected by mold, imbedded dirt, insect infestation, decay or other foreign material, of which not more than one-fifth or 1 percent by weight may be affected by decay. The total of all defects mentioned herein, within the limits prescribed above, shall not exceed 15 percent by weight. In addition not more than 10 percent by weight of the halves may be fairly well colored.

U. S. GRADE C or U. S. STANDARD dried pears are halves that are whole or reasonably whole and fairly well colored, and are

The VIKING PEELER



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2. Cut bevel gears, 4 Pitch.
3. 10" dia. thrust bearing running in oil.
4. Genuine carborundum abrasive FUSED onto entire inner surface of peeling Hopper and upper surface of revolving Disc. Abrasive cannot be torn by foreign material in Hopper.
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prepared from properly matured fruit. Not more than 15 percent by weight of the dried pears may be affected by russet or similar discoloration or damaged by discoloration, sunburn, hailmarks, limb-rubs, hard end, black end, external stems and calyx cups, scab, disease, insect injury or other defects; not more than 5 percent by weight may be scabs, scraps or pieces smaller than two-thirds of a half; not more than 10 percent by weight may be immature; not more than 7 percent by weight may be affected by mold, imbedded dirt, insect infestation, decay or other foreign material, of which not more than two-sevenths or 2 percent by weight may be affected by decay. The total of all defects mentioned herein, within the limits prescribed above, shall not exceed 20 percent by weight.

OFF-GRADE dried pears are dried pears that fail to meet the requirements for U. S. GRADE C or U. S. STANDARD.

"Width" means the longest measurement obtainable, measured at right angle to a line running from the stem to calyx end. "Properly matured" means pears which, when harvested, have reached a state of development that will insure the proper completion of the ripening process. "Immature" means that the halves have a grayish color indicative of immature fruit. "Well colored" means that the halves are bright and translucent, not darker than pear yellow in color. "Fairly well colored" means that the halves are fairly bright and fairly translucent and are of any normal color not darker than dark amber. "Well shaped" means that the halves are practically whole and as symmetrical as could be expected from normally shaped pears cut longitudinally into approximately equal halves. "Fairly well shaped" means that the halves are practically whole and are not so round as not to be pear shaped, nor so irregular as to be badly misshapen, and are cut longitudinally into approximately equal halves. "Reasonably whole" means that not more than one-third of the half has been removed.

"Damage by discoloration" means: Skin discoloration caused by sunburn, limb-rubs, hailmarks or other means which, when light brown in color, exceed in the aggregate one-eighth of the surface and which, when dark brown or darker, or hard, tough and leathery, exceed in the aggregate one-sixteenth of the surface; or flesh discoloration caused by bruising, drought spot or other means which are materially darker or lighter than the normal color of the half and which exceed in the aggregate one-sixteenth of the surface. "Russet or similar discoloration" means reddish brown discoloration caused by sunlight when the area so affected is conspicuous. "Damage by hard end or black end" means the light colored areas at the calyx end of the fruit or similar damage which exceed in the aggregate one-eighth of the surface. "Damage by other defects" means any defect or combination of defects not mentioned herein which materially affect the appearance, edibility, or keeping quality of the fruit. "Slab" means the half is definitely soft, mushy or mutilated. "Insect infestation" means the pears are infested with live insects, insect remains or excreta.

ISSUED: July 28, 1942
EFFECTIVE: August 1, 1942

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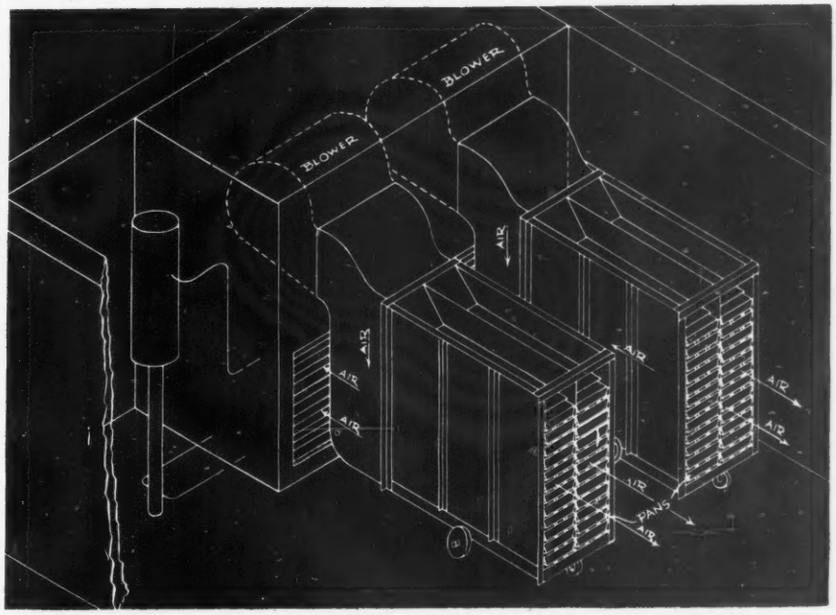

Offers *Tremendous Capacity and High Freezing Speed... in small floor space...*

This modern way to Fast-freeze in shorter time, at less cost employs continuous blasts of cold air, at sub-zero temperatures, forced at great velocity over trays of foods in a tunnel.

Particularly flexible in its adaptation to production processing, this Freezing Unit is available in two general types. Type A, for larger packages, bulky products and volume production, uses a long freezing tunnel through which food-laden trucks are charged continuously. Type B, for smaller products or "spot freezing," uses enclosed, open-end trucks, moved against the blower outlet as illustrated. Each has its place, depending upon the volume and type of food to be frozen.

VILTER FRIGID BLAST FREEZING can help the vast Food Industry to faster, surer, more economical protection of meats, fish, poultry, vegetables, fruit and many other products. Write for complete details to fit YOUR needs.

★ **Above—Vilter FRIGID BLAST Freezer—Type B, Double unit, showing the open-end trucks wheeled into position in front of the Blower Unit. Freezing capacity, about 1000 pounds per hour.** ★

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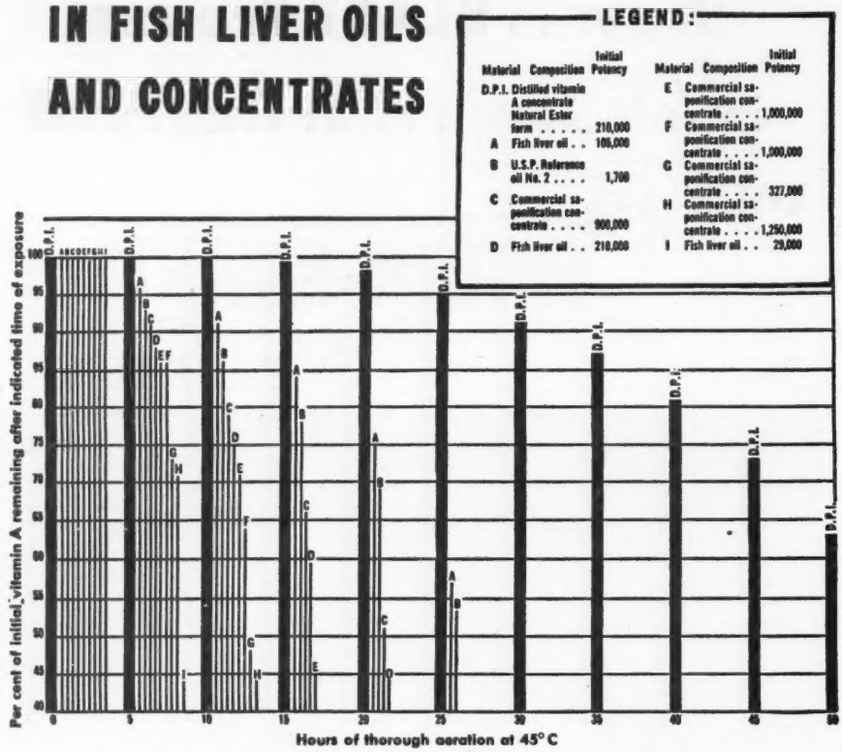
COMPARATIVE STABILITIES OF VITAMIN A IN FISH LIVER OILS AND CONCENTRATES


LEGEND:
Material Composition Initial Potency
D.P.I. Distilled vitamin A concentrate Natural Ester form 210,000
A Fish liver oil . . 100,000
B U.S.P. Reference oil No. 2 1,700
C Commercial saponification concentrate 900,000
D Fish liver oil . . 210,000
E Commercial saponification concentrate 1,000,000
F Commercial saponification concentrate 1,000,000
G Commercial saponification concentrate 327,000
H Commercial saponification concentrate 1,250,000
I Fish liver oil . . 29,000
Per cent of initial vitamin A remaining after indicated time of exposure
Hours of thorough aeration at 45° C

The very significant chart above is the recent version of the chart first published in "The Story of Vitamin A Esters," 1939 edition. The marked difference between the Distilled Esters and other materials obtained on the open market has been confirmed; indeed the difference has become even more pronounced due to continued improvement in the production of Vitamin A Esters.

For a comparative test of stability (resistance to oxidation by heat and air), a sample of standard Distilled Vitamin A Ester concentrate together with representative samples of well known fish liver oils and vitamin A concentrates were subjected to an accelerated keeping test in our laboratories.

These vitamin A materials were first assayed to determine initial potency, then placed in especially designed reaction cells and subjected to thorough aeration at a temperature of 45° Centigrade (113° F.) for five hours at a time. At the end of each five-hour period the vitamin A potency of each concentrate was determined by the antimony trichloride reaction.

In this severe test the Distilled Vitamin A Ester concentrate was able to maintain almost 100% of original potency while all but four of the other materials suffered over 60% vitamin destruction. At the 20-hour mark, the Distilled Vitamin A Ester concentrate still assayed 97% of its original potency. The next concentrate assayed 51% and the two best fish liver oils tested 75% and 44% respectively. At the end of 30 hours, all other concentrates had suffered over 60% vitamin A destruction; yet Distilled Vitamin A Ester concentrate retained 92% of original A strength.

As this stability-test chart demonstrates, Distilled Vitamin A Ester concentrate is from two to ten times more resistant to the action of heat and air than the other representative vitamin A materials tested—a fact which in part explains the strikingly increased demand by food processors for our Distilled Vitamin A.

And remember—Distilled Vitamin A in the natural Ester form is *bland*. It does not impart flavor or odor to the most delicate foods. It is *continuously available*, and in scientifically *uniform quality*. Potency specifications are met precisely to your order.

Get the facts about this superior Vitamin A concentrate. Write for "The Story of Vitamin A Esters," new, completely revised edition.

● **Here is evidence of the superior stability of DPI Vitamin A Esters*, the potent concentrate of vitamin A produced by high vacuum molecular distillation. Get all the facts—today.**

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Sales Agent:

Special Commodities Division, General Mills, Inc., Minneapolis, Minn.

"Oil-Soluble-Vitamin Headquarters"

FORMULAS FOR FOODS

FORMULA NO. 372

Honey Cake

Brown sugar, sifted	2 lb.
Sugar, fine granulated	12 oz.
All-purpose vegetable shortening	1 lb. 1 oz.
Butter	8 oz.
High-grade cake flour	3 lb. 12 oz.
Salt	1¼ oz.
Whole eggs	1 lb. 14 oz.
Liquid milk	2 lb. 8 oz.
Honey	1 lb. 10 oz.
Vanilla	1 oz.
Baking powder	2 oz.

Mixing Directions

Cream together the brown sugar, granulated sugar, shortening, butter, salt, and 12-oz. of flour. Mix 5 minutes on low speed, then add the eggs gradually over an 8-minute creaming period. Dissolve the honey in the milk, being sure that the honey is all dissolved. Add one-third of the honey and milk mixture, then stir in the remaining flour and baking powder, sifted together, and mix until smooth. Finally add the rest of the honey and milk mixture. Mix for 3 minutes on low speed.

Baking

Scale 1 lb. 4 oz. for a dozen cup cakes or 12 oz. in a deep round layer pan. Bake 25 to 30 minutes at 375 deg. F. Allow to cool in the pans. Decorate with a nut topping or the honey nougat icing (Formula No. 378).

Formula from Lever Bros.

FORMULA NO. 373

Crumb Cookies

Egg whites	3 lb.
Sugar	4 lb.
Glucose	8 oz.
Salt	½ oz.
Raisins	4 lb.
Pecans	2 lb.
Nutmeg	¼ oz.
Mace	¼ oz.
Cinnamon	1 oz.
Cake crumbs	4 lb.

Directions

Beat egg whites and glucose. Add sugar and salt slowly till whites begin to foam up, then whip for about 10 minutes. Chop the raisins and nuts. Mix with the cake crumbs and spices, and fold by hand into the whipped egg-sugar mixture. The cake crumbs should be sifted.

Other chopped dried fruit can be used in place of the raisins, and 2-oz. prepared mixed cake spice can be substituted for the spices named above, if necessary.

Deposit from pastry bag with a plain tube onto greased and dusted pans. Bake at 375 deg. F.

This will make a macaroon-type cookie, without coconut. The cookies can be glazed with a thin glucose glaze, 2-lb. glucose to 1-lb. water, and may be garnished with nuts, cherries, etc.

Formula from Wilson & Co.

FORMULA NO. 374

Baked Veal and Pork Loaf

Veal trimmings	60 lb.
Regular pork trimmings	40 lb.
Salt	3 lb.
Invert sugar	3 oz.
Dry milk solids*	10 lb.
White pepper	6 oz.
Cinnamon	2 oz.
Onion powder	1 oz.
Garlic powder	¼ oz.
Mapleine	2 oz.

* Not over 1¼ percent fat.

Directions

Grind veal trimmings through ⅛-in. plate, and pork trimmings through ⅜-in. plate. Put the veal trimmings, salt and invert sugar in a silent cutter and chop almost fine. While chopping, add enough shaved ice to have a mass of the right consistency. Add the pork trimmings, dry milk solids and seasoning. Chop fine.

Put in pans that have been prepared with a thin film of grease inside. Smooth the top of the meat with a paddle dipped occasionally in thin sugar sirup.

Bake for 2½ to 3 hours at 225 to 250 deg. F.

Stuff in cellulose casing, which adds to appearance and facilitates handling.

Formula from American Dry Milk Institute, Inc.

FORMULA NO. 375

Tomato Soup Cubes

Potato flour	44 lb.
Sago flour	40 lb.
Onion powder	5 lb.
Tomato puree, concentrated	60 lb.
Salt	16 lb.
Sugar	12 lb.
Cassia, ground	3 lb.
Curry powder	1 lb.
Red coloring	

Directions

Heat and stir the puree in a steam-jacketed kettle. Add sugar, salt, onion, curry and cassia, heating and stirring continuously. Then add the sago and potato flours, together with the coloring, and heat and stir until dry. Press into cubes and wrap.

Dried tomato powder may be used in place of puree.

Formula from H. B. Cronshaw, Surrey, England

FORMULA NO. 376

Orange Cookies

Shortening*	1 lb. 8 oz.
Granulated sugar	1 lb. 8 oz.
Whole eggs	12 oz.
Honey	3 lb.
Liquid milk	4 oz.
Pastry flour	4 lb.
Baking powder	1 oz.
Soda	½ oz.
Salt	½ oz.
Cinnamon	¼ oz.

* Preferably part butter

Directions

Partially cream shortening and granulated sugar, then add eggs and cream light. Stir in honey and milk mixed together. Immediately add the dry ingredients which have been sifted together, and then the fruit mixture given below.

Drop by machine or pastry bag on lightly greased and dusted pans. Bake at 400 deg. F. oven temperature for 10 to 12 minutes.

Fruit Mixture

Glazed orange peel	12 oz.
Toasted nut meats	8 oz.
Honey	8 oz.

Use only a sweet flavored orange peel. Grind the peel and nut meats, add honey, and allow to stand for at least 30 minutes before using.

Formula from General Mills

FORMULA NO. 377

Whole-wheat Bread With Soya Flour

Whole wheat (finely ground)	100 lb.
Soya flour	8 lb.
Water (variable)	70 lb.
Yeast*	2½%
Light refiners' cane sirup	7 lb.
Salt	2¼ lb.
Shortening	1 lb.
Yeast food	2 oz.

* Based on the flour, in this case 2¼ lb.

Directions

Mixing time on high speed should be 7 to 8 minutes, with the temperature of the dough 78 deg. F.

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Total time for fermentation should be 2½ hours, divided as follows: First fold (four-fifths expansion), 1½ hours; second fold, ¾ hour; to bench, ¼ hour. Bake at 350 deg. F.

Formula from Stein, Hall Mfg. Co.

FORMULA NO. 378

Honey Nougat Icing

Fine granulated sugar	1 lb. 10 oz.
Butter	6 oz.
Liquid milk	1 lb.
Honey	8 oz.
Sugar, 6X	4 lb.
Salt	¼ oz.
Vanilla	¼ oz.
All-purpose vegetable shortening	1 lb. 3 oz.
Pecans, chopped	5 oz.

Directions

Boil the granulated sugar, butter, honey and ½-lb. milk to 250 deg. F., stirring constantly after it starts to boil. At least once after boiling starts, wash down the sides of the kettle with a clean brush and warm water. Place the 6X sugar, salt, vanilla and shortening in a bowl but do not cream. Then add the boiling sirup to this mixture and cream on low speed until well mixed. Gradually add the remaining cold milk. The amount of this milk may be varied to get the proper spreading consistency. Mix in the chopped nuts.

After this icing is cold it can be reheated by placing the container in a pan of boiling water and stirring until it is at the proper spreading consistency. A small amount of hot milk may be added if required.

The quantity of pecans can be increased.

Formula from Lever Bros.

FORMULA NO. 379

Banana Curd

Sugar	56 lb.
Glucose	20 lb.
Margarine	4 lb.
Liquid eggs	1 gal.
Lemon juice, raw	1 gal.
Ripe banana pulp	1 gal.
Wheat flour	14 lb.
Water	5 gal.
Yellow coloring	

Directions

Soak flour overnight in 2 gal. of the water. Next day place rest of water in steam jacketed kettle together with sugar and glucose. Bring to a boil and add the flour paste, stirring well. Bring to boil again, stirring well all the time.

Add the margarine and the eggs which have been well beaten. Raise to 212 deg. F. and add the banana pulp. Raise to 218 deg. F. and hold at 216 to 218 deg. F. for 10 minutes. Stir well.

Pass through a fine sieve, cool to about 180 deg. F. Fill into clean and dry containers.

To prepare the banana pulp, peel the fruit and place 50 lb. in a steam-jacketed kettle with 3 gal. of water. Simmer till soft, then pass through a fine sieve. Bottle in 2-gal. containers at not less than 180 deg. F.

Formula from H. B. Cronshaw, Surrey, England.

FORMULA NO. 380

Peanut Crisps

Sifted peanut flour	2 lb.
Peanuts, finely chopped	2 lb. 6 oz.
Sugar	4 lb. 8 oz.
Salt	⅞ oz.
Egg whites	4 lb. 14 oz.
Almond extract	1 oz.

Directions

Mix fresh roasted and ground peanuts, sugar, flour and salt thoroughly. Beat the egg whites until stiff, add the flavoring, and fold into the first mixture.

Drop well apart on lightly greased and floured cookie pans. Bake at 350 deg. F. for 12 to 15 minutes.

Formula adapted from household recipe developed by the Bureau of Home Economics, U. S. Department of Agriculture.

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ANALYSIS

CHAS. PFIZER & CO., INC. has always regarded the careful and intelligent examination of all products as not only a necessary but also an important part of its manufacturing processes. We believe that the uniformity and high purity of our products cannot be assured without thorough examination and that it involves more than just the routine checking of materials against certain specifications.

The personnel of our Analytical Department is of the highest caliber and every effort has been made to make the most modern equipment available. Through thorough and careful analysis it has been possible for this department to make many suggestions which have resulted in improved products and improved methods of manufacture.

The research division of this department is constantly striving to improve or devise new techniques for the examination and analysis of our materials. New products, too, have always occasioned considerable analytical research, it often having been necessary to revise existing analytical methods to a great extent, or even to devise entirely new procedures. Needless to say, all of this would be impossible if analysis were considered to be merely a routine matter.

We feel that the reputation for dependability and high quality which our products enjoy is due in no small measure to our Analytical Department.

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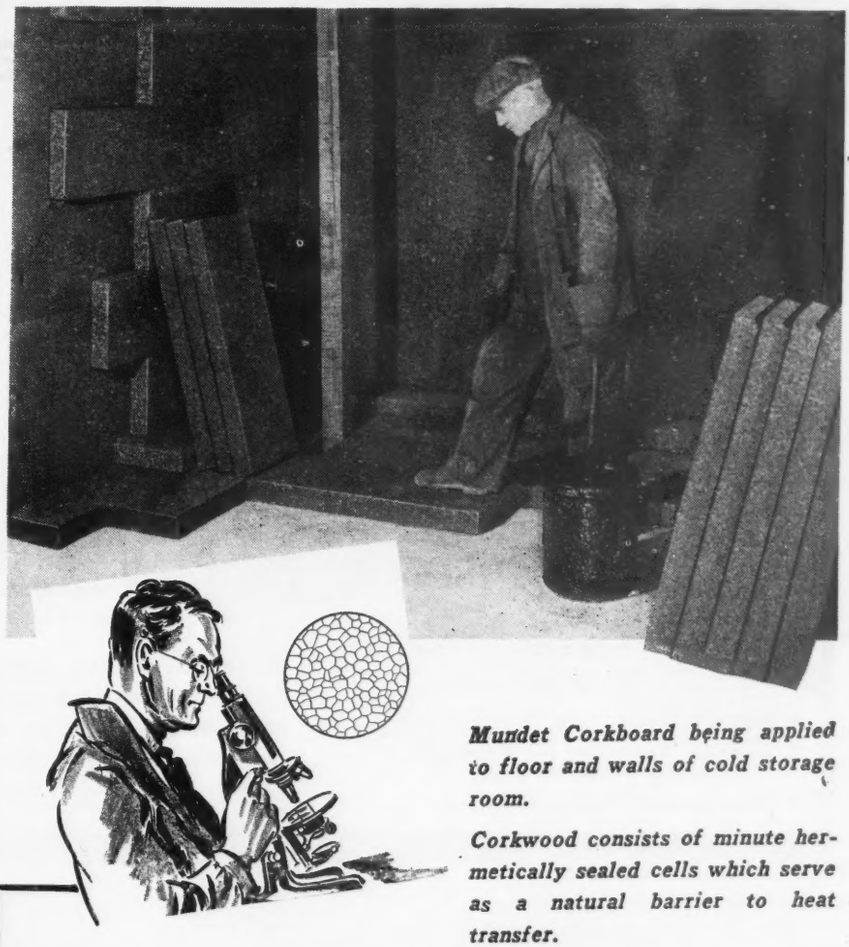

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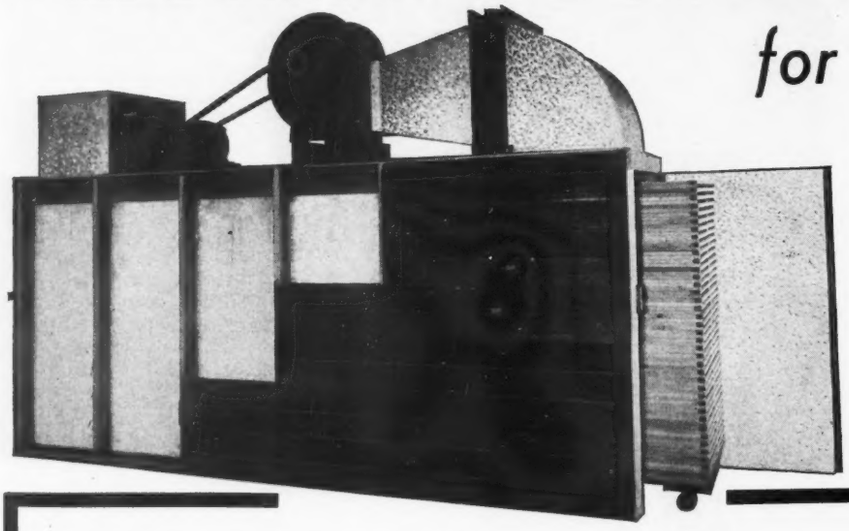

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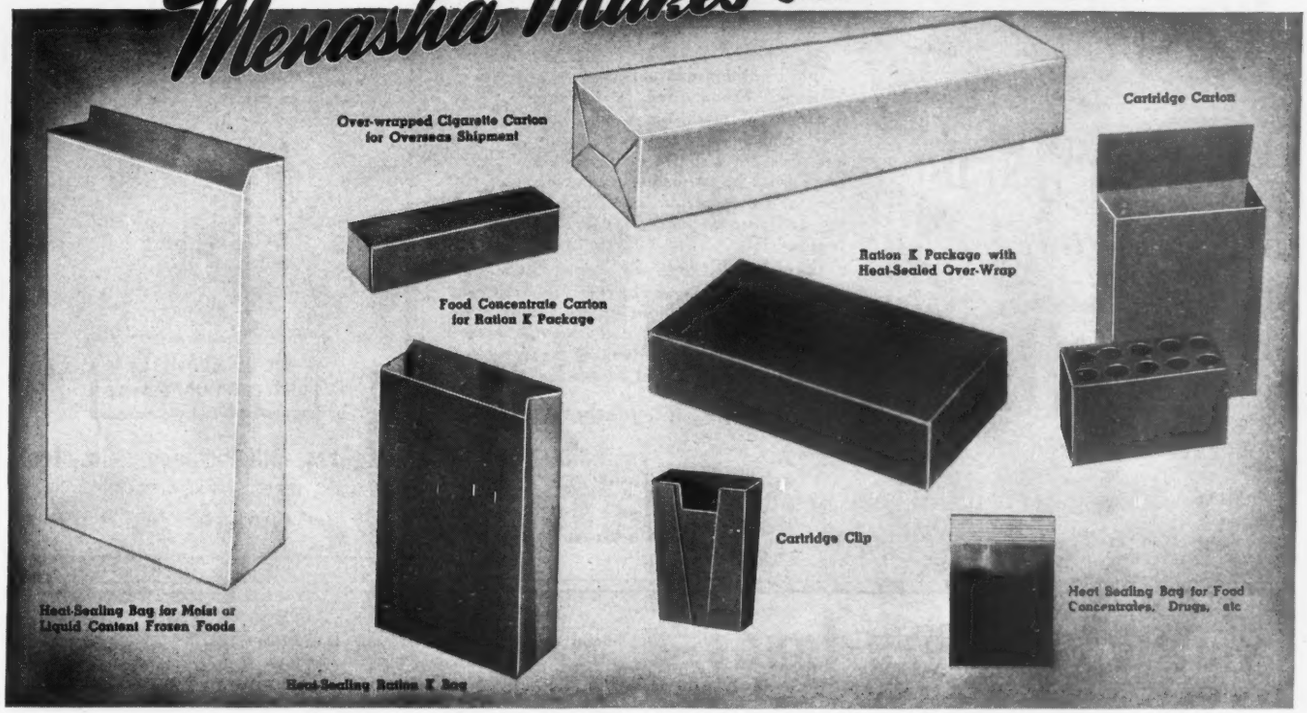
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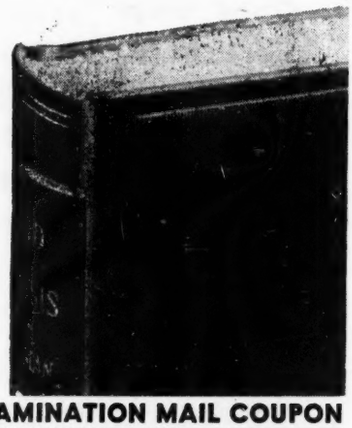
How to analyze foods

according to latest scientific methods

How to interpret your findings *with the highest degree of accuracy*

Food analysts, chemists: use the newest methods and scientific data in this top-ranking manual to bring your work right up to the minute and in line with the improved, laboratory-tested, proven-accurate processes and techniques for detecting adulteration in food products.



FOOD ANALYSIS

By A. G. WOODMAN

Associate Professor of Analytical Chemistry, Emeritus, Massachusetts Institute of Technology

4th ed., 607 pages, 5½ x 8, 82 illustrations, 94 tables, $4.00

CHAPTERS

1. General Methods
2. The Microscopical Examination of Foods
3. Food Colors and Preservatives Chemical Preservatives
4. Milk, Cream and Ice Cream
5. Edible Fats and Oils Olive Oil Butter
6. Carbohydrate Foods Maple Sirup Honey
7. Cocoa and Chocolate
8. Spices Pepper Cassia and Cinnamon Cloves Mustard
9. Cider Vinegar
10. Flavoring Extracts Extract of Vanilla Lemon Extract Extract of Ginger
11. Alcoholic Foods Wine Whisky

This new book offers a fundamental and well-balanced training in the methods of food analysis for the detection of adulteration. Typical foods illustrate methods of attack and analysis. Bearing out the author's belief that exercise of judgment and training of sense of discrimination are the principal benefits to be gained from a critical balancing of data obtained in a food analysis, the book gives almost equal emphasis to interpretation of results as to the processes themselves. Much new information has been added to this edition, especially on

—alcoholic beverages

—sugar methods for foods affected by admission of dextrose on a par with cane sugar

—new permitted dyes, including oil-soluble colors

—etc., etc.

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For Liquid-fill check-weighing Operations...

Frozen eggs in cans have been replaced with cellophane lined cartons — Photo courtesy, Du Pont, Wilmington, Delaware.

Frozen Eggs in New Package...

Scarcity of labor, overburdened transportation space and lack of tin for canning have forced new food packaging methods. Liquid-fill operations are not new as such but liquid-fill in cellophane lined cartons are. Volumetric carton filling is hazardous . . . invites overweight as well as underweight containers. Such products as edible oils, lard, eggs and cottonseed shortening can best be packaged by sound, predetermined, fraction-ounce weighing to insure profits. Illustrated is a typical liquid-fill operation with EXACT WEIGHT floor-type scale featuring, easy-to-read top reading dial, especially built for such operations. If you have such an operation you should have full details for your plant. Write for them.

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INSIDE NEWS

JANUARY PREPARED BY NATIONAL CAN CORPORATION, NEW YORK, N. Y. 1943

Two New Methods for Processing Fish

Save Time, Labor and Yield Superior Canned Product

Two methods of processing fish before canning, which have many advantages over present methods of production, have been developed through experimental work undertaken by the Fisheries Research Board of Canada through its Pacific Coast stations. One of the new methods involves smoking, the other steaming.

The product prepared by smoking had a better appearance than the usual raw pack, each fish being entirely separate and firm enough to be lifted out of the can in its entirety. In the smoking precedure, fresh herring were scaled, dressed and washed, then they were brined in saturated brine for 15 minutes. After being spread on ½-inch mesh wire trays, the fish were placed in a smokehouse previously heated to 150 degrees F. and were smoked for 30 minutes, using wood shavings and sawdust. After smoking, the fish was sufficiently dried so that it could be handled and packed in cans with ease. The next step was to pack the product in 1-lb. oval or tall cans with about 2 ounces of tomato puree added to each can. The cans were then steamed for 12 minutes with the lids merely resting on top of the cans and then the containers were closed and the product cooked for 90 minutes at 250 degrees F.

The steaming technique preparatory to canning produced a pack with an attractive appearance. The fish were firm and retained their shape even when lifted out of the can, and the flavor and odor were very good. In steam-packing, fresh herring were scaled, dressed and spread on wire screens and steamed from 5 to 10 minutes in a closed retort. The fish were then placed in the smokehouse (which in this case was operated as a drying unit) and dried in a current of warm air for 30 minutes. They were then packed in tin cans and cooked as was done with the smoked pack.

See Progress Report No. 52, Pacific Fisheries Experimental Station, Vancouver, B.C., of the Fisheries Research Board of Canada. (250)

Argentina to Export Yerba Mate to U. S.

South American interests in Argentina have sold to a United States firm 5,000 tons of yerba mate for delivery before the end of 1942. The sale has excited considerable interest in the future export possibilities of this herb. The government of Argentina has issued a decree authorizing the intensification of production of mate. As a result of exhaustive laboratory tests made during the last year in the United States, the mate will be submitted to large-scale processing for the extraction of valuable chemical substances, especially chlorophyl. The present local production of mate is estimated at 72,000 tons annually. (251)

* * * * *

To prevent scurvy from Vitamin C deficiency in war areas, over 500,000 gallons of concentrated fruit juice will be shipped abroad in individual containers. When concentrated the syrup holds 85% of the original vitamin content.

AMA Orders First Dehydrated Pork for Overseas Shipment

The U. S. Department of Agriculture reveals that the Agricultural Marketing Administration has awarded its first contract for dehydrated pork for shipment overseas. The AMA buys all food for Lend-Lease shipment. The new product, which never has been on the commercial market, is made of pre-cooked, fresh, extremely lean pork. Granular in shape, its color and texture are similar to brown sugar.

Dehydrated pork has about one-third the volume of the original boneless meat and weighs about one-fourth as much. Large-scale drying and dehydration of other farm products for Lend-Lease shipment—such as dairy products, vegetables, fruits and eggs—already has saved thousands of tons of shipping space in getting urgently needed food products to the allied nations.

Although in the experimental stage when the war began, meat dehydration has made rapid strides under the impetus of wartime needs for concentrated foods. Large scale production has been encouraged by government orders and it is expected that by early next year at least 10 processors, mainly in the mid-west, will be producing the concentrated pork. It is now being substituted for beef, as there is a greater supply of pork generally available. (252)

* * * * *

Glue factories are having a race to keep up with the increased demand caused by substituting wood for metal and restricting the manufacture of nails.

* * * * *

Venezuela can supply upward of a million pounds of silk cocoons a year. Mulberry trees, diet of silk worms, flourish there.

NATIONAL CAN

PLANTS: NEW YORK • BOSTON • BALTIMORE • CHICAGO • HAMILTON, OHIO • FORT WAYNE, INDIANA

New Process Yields Alcohol From Wastes

Smokeless powder and synthetic rubber can be made cheaply and abundantly using alcohol from watery wastes now poured down the sewer. Waste liquors from paper mills and other industrial plants, as well as sawdust, straw, cornstalks and other agricultural wastes, contain sugars capable of being fermented into alcohol. But the solutions are so thin and watery that the fuel needed for distillation is worth more than the alcohol that could be obtained.

Key to the riddle is fusel oil. Fusel oil dissolves alcohol but will not mix with water. So it is put to work getting the alcohol out of the watery wastes. Subsequently a chemical divorce between the alcohol and the fusel oil is arranged. A similar use of fusel oil can be made in getting acetone and other valuable industrial solvents out of solutions until now considered too thin to be profitably worked. (253)

New Toxic Agent For Insect Sprays

Thanite, a remarkable new toxic agent for insect sprays, is relieving the insecticide manufacturer from dependence upon foreign sources of supply. The usual imported toxic ingredients — pyrethrum, derris, cube and others—are becoming almost impossible to obtain. Insecticides are helping to win the war by enabling the farmer to get better production. They are also instrumental in the control of disease. Thanite is being produced from domestic raw materials available in quantity. In the past season it was just getting into production. Next year it will be used extensively. Chemically it is known as secondary terpene-alcohol thiocyanyl acetate and is a stable compound. (254)

Free Room and Board For War Workers

As part of its wartime speed-up program, a large canning company in New Jersey has made special arrangements for the lodging, feeding and transportation of the extra workers employed. Free lunches for all workers are served in the company cafeterias and other meals are sold at minimum prices in the camp mess hall. Some of the workers get free lodging in a former CCC camp six miles from the plant, with free transportation between the camp and the plant. (255)

* * * * *

Barrels are being constructed of plywood in Germany, according to reports reaching the Department of Commerce. The walls of the barrel are wound in puttee fashion in three overlapping layers and opposite directions over a metal core, after which strips of veneer treated with synthetic resin are applied.

Technical Topics

CELLULOSE—Several species of native and imported bamboo grow along the Gulf coast of Texas and Louisiana. No plant can produce as much cellulose per acre as certain species of bamboo. (256)

FUELS—A truck, fitted with a gas producer originally designed for anthracite, has been running on sawdust in Great Britain. Diesel trucks in tests have shown good performance using vegetable oils grown in West Africa—peanut, cottonseed and palm oil. (257)

PECAN SHELLS, long of no industrial value, are being used in the production of activated charcoal as a filler for gas masks. Many thousands of pounds will be processed in a 95,000 square foot factory reconditioned for this work. (258)

FISH LIVER OILS—Uruguay's fish industry reports several fish with liver oil far greater in vitamin A content than cod, required by international standards to have at least 800 units of vitamin A per gram. Among these are hake, averaging 18,000 units per gram, corvina, 26,000 units per gram, bagre from 90,000 to 100,000 units per gram. (259)

BITUMEN EMULSIONS, in which soap acts as an emulsifying agent, are being employed in Britain in blacking-out conspicuous surfaces, such as roadways. The dilute bitumen emulsion is applied to the roadway and then dusted with coal. A cheap and durable blackening effect is said to result. (260)

ALGIN is being investigated in Eire in connection with the making of waterproofing agents and plastic materials. Tests have also proved it to be a satisfactory substitute for sago flour in the sizing of twine. Its possibilities as a starch substitute are being studied. (261)

ROSIN usually free from impurities and clean and bright in appearance is claimed to be easily produced by a process described in a recent U. S. patent assigned to the Secretary of Agriculture. Basis of the process is the drying of the crude oleoresin by the addition of turpentine near the end of the normal distillation period, so that the whole mass may be readily filtered through various clarifying media, including paper. (262)

SODIUM METASILICATE and an alkyl sulphonate are combined in a new preparation suggested for cleaning bright steel surfaces difficult to clean. The sulphonate reduces the surface tension and assists the metasilicate solution in removing the grease film after two seconds contact. (263)

WAX BLEND—Carnauba wax may be substituted with a blend of beeswax, shellac wax, and sal dammar, it is suggested by an Indian Forest Research Institute. The compound is a blend of eighty-five parts of shellac wax, ten parts of beeswax, and five parts of finely ground sal dammar. (264)

SULPHURIC ACID has been found effective in increasing the gum flow of pine trees employed for naval stores production. Tests on slash pine showed an average increase of 25 percent in the gum flow when a 40 percent solution of sulphuric acid was applied directly to fresh streaks immediately after chipping. More than 100 possible stimulants were investigated in the tests, but sulphuric acid gave the best results. (265)

INVISIBLE INSECTICIDE—A new invisible insecticide paint is being marketed for use on windows and door screens in army cantonments, and for the hotel and restaurant trade. (266)

ACID DETERGENTS are opening a new era in food sanitation. The major objections to the use of acid detergents in the past have been their inherent corrosiveness, poor penetrating and peptizing properties, and general lack of other cleaning characteristics. These drawbacks have now been largely overcome. (267)

CITRONELLA — Geraniol and citronellal separation from citronella oil by an improved method is claimed in a recent British patent. The procedure comprises mixing the essential oil with reactive amine and thus causing the reactive aldehyde to form a condensation product of relatively high boiling point. The volatile noncarbonyl compound is then separated by distillation. (268)

Every effort will be made to furnish additional information on these articles. Where such information is not obtainable, we will refer inquirers to the original source of the article. Write to National Can Corp., 110 E. 42nd Street, New York City. Please mention the number at end of article—also name of the magazine you saw it in.

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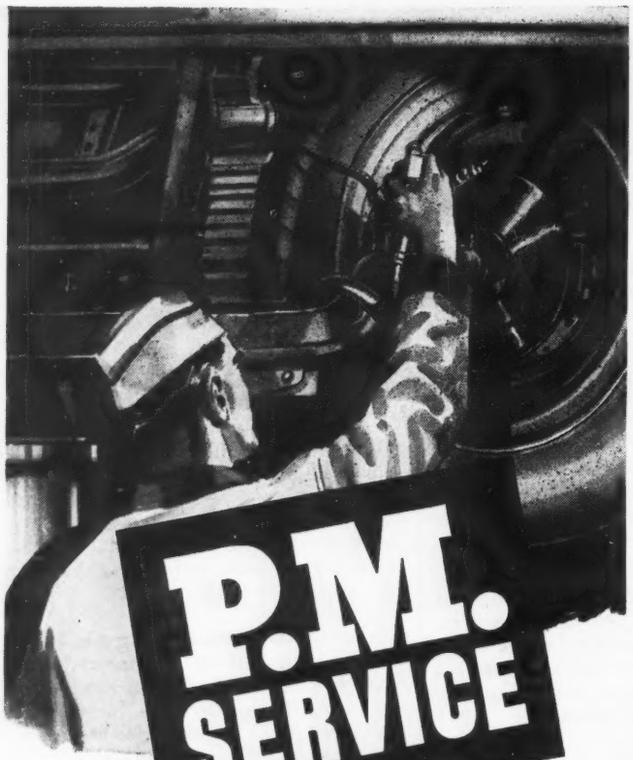

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- Mixers, All Kinds
- Monel Metal Fabricator
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- Pans, All Types, All Metals
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One of Anchor Hocking's ablest men, Dave Corin of the New York office, has been with the company 30 years.

Modern, lightweight Anchor Hocking glass containers are uniformly stronger, safer to handle, less expensive and cost less to ship than their heavier predecessors. And with modern filling, capping, labeling and conveyor equipment glass containers can be handled practically as fast and economically as cans.

No matter what you pack—solid, semi-solid, powder or liquid; or how you pack it—hot or cold—with or without vacuum, sterilized or processed; no matter where its final destination may be, or when—there is a suitable Anchor Hocking container and closure to most completely satisfy your diverse requirements... subject to government regulations, of course.

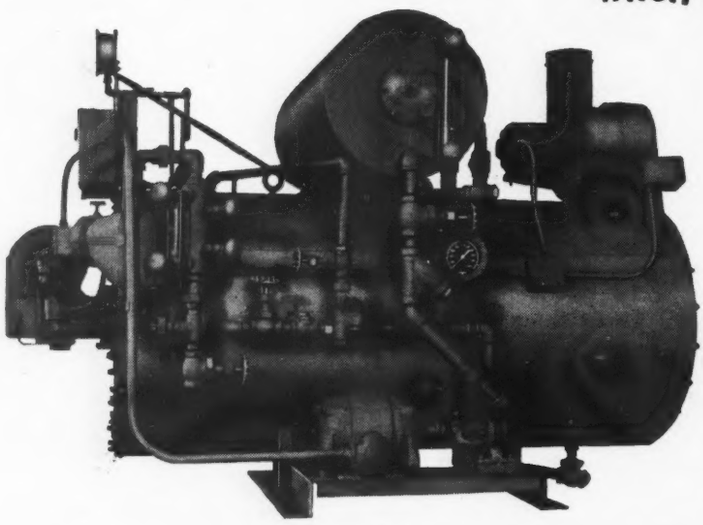
ANCHOR HOCKING®

GLASS & CAPS

ANCHOR HOCKING GLASS CORPORATION · LANCASTER, OHIO

TOUGH ENOUGH TO TAKE IT

when the going gets rough!



Whether in camp maneuvers or speedy action under fire — whether in sweltering heat or bitter cold — the Army's new mobile laundry units must be able to take it! Designed to stiff Army specifications as a vital part of the mobile unit — this compact 15 h.p. O & S Boiler is built to weather extremes in temperature and the bumps and jars of rough terrain. Its condensate return system is *built-in*—and offers *induced* draft in addition to these advantages:

★ **100 lbs. pressure from 60° water in 20 minutes!**
★ **Fully-automatic control!**
★ **Weight complete - 2100 lbs.!**

Although developed expressly for mobile use in the Army's laundry units, this revolutionary O & S boiler promises wide application in your industry when Victory makes O & S boilers again available for all purposes.

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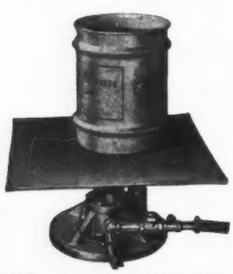
O&S *Builders of Better Boilers Since 1885*

PACK IT DOWN! with SYNTRON

REG. TRADE MARK



High-Speed Electric

VIBRATORY PACKERS

3,600 vibrations per minute —rheostat controlled power for variable adjustment to meet material requirements. Capacity from large barrels to small containers.

"Explosion-Proof" Water Operated

HYDRAULIC JOLTERS

100 short, sharp jolts per minute are particularly effective on packing light, fine, fluffy materials and for general use in hazardous locations — under explosive atmospheric conditions, etc.

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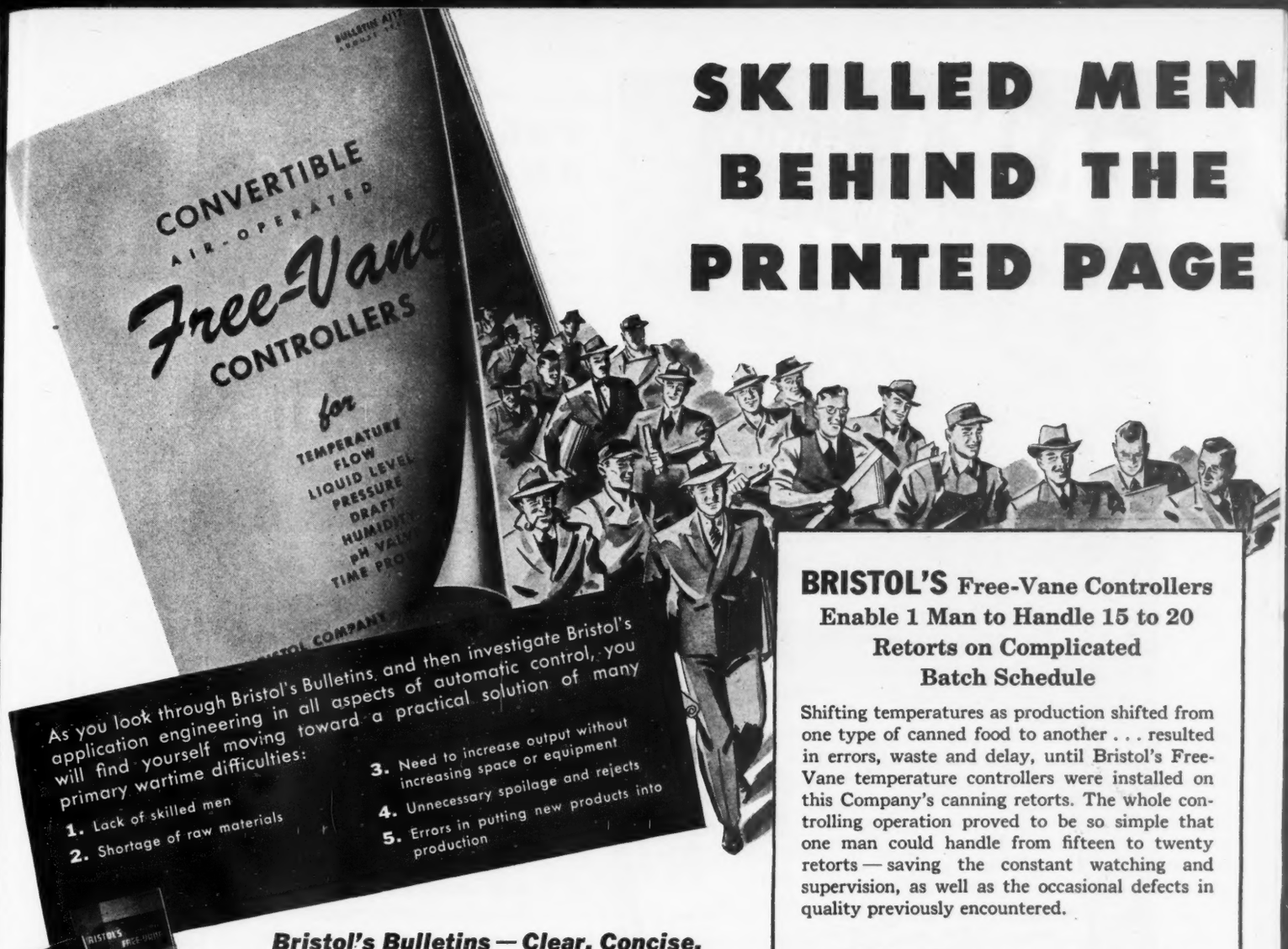
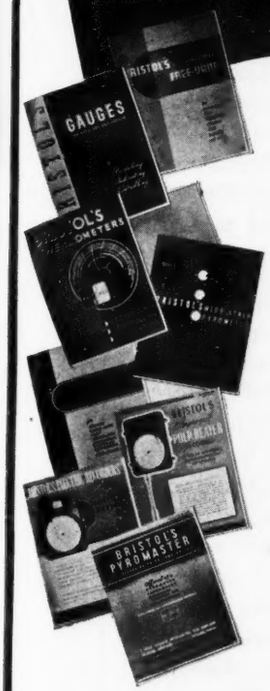


As you look through Bristol's Bulletins, and then investigate Bristol's application engineering in all aspects of automatic control, you will find yourself moving toward a practical solution of many primary wartime difficulties:

1. Lack of skilled men
2. Shortage of raw materials
3. Need to increase output without increasing space or equipment
4. Unnecessary spoilage and rejects
5. Errors in putting new products into production



Bristol's Bulletins — Clear, Concise, Complete — Sum Up Latest Advances of Wartime Instrument-Engineering

For instance, the Free-Vane system of control, originally developed by the Bristol Company in 1932, is now available in a convertible design, enabling you to adapt your instruments to changing processes by following simple instructions in your own plant. This feature is added to the exceptionally prompt undistorted response of Free-Vane Controllers, arising from the patented, free-floating action of the control mechanism.

Bulletin A 112 describes in 8 concise pages the new convenience and flexibility of Free-Vane Controllers. Write for it, together with other bulletins for your industry, addressing the Bristol Company, 115 Bristol Road, Waterbury, Connecticut.

BRISTOL'S Free-Vane Controllers Enable 1 Man to Handle 15 to 20 Retorts on Complicated Batch Schedule

Shifting temperatures as production shifted from one type of canned food to another . . . resulted in errors, waste and delay, until Bristol's Free-Vane temperature controllers were installed on this Company's canning retorts. The whole controlling operation proved to be so simple that one man could handle from fifteen to twenty retorts — saving the constant watching and supervision, as well as the occasional defects in quality previously encountered.

FREE Bulletins From Bristol's Library of Engineering Data — for Every Executive Responsible for Wartime Production

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Please send me Bulletin A 112.

☐ Bulletin 536 — how to record and control pH value most efficiently with Bristol's potentiometers. Describes advantages of pH control and glass electrode method of measurement.

☐ Bulletin T-302 — how to select and install Bristol's Fully-Compensated Liquid-Filled Recording Thermometers (− 125°F. to + 400°F.) with complete facts, nomenclature and typical chart record.

☐ Bulletin 550 — Instruments for Dairy Industries are described in detail, together with installation data for many types of dairy equipments and typical charts for pasteurization, heating, cooling and storage temperatures.

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Engineers Process Control for Better Products and Profits

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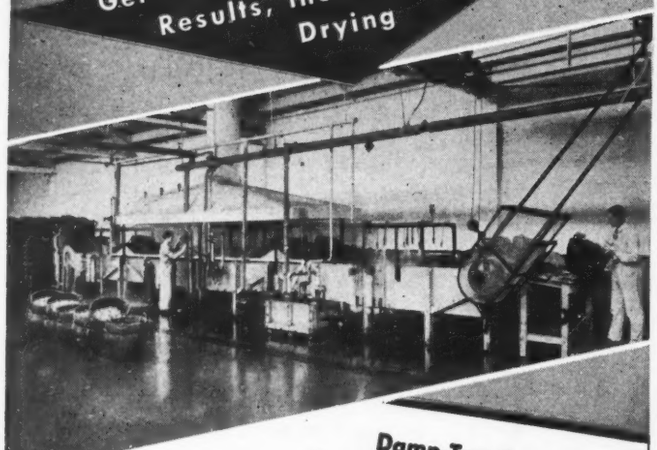
PAINT PROTECT BEAUTIFY WALLS AND EQUIPMENT WHILE THEY'RE WET

Get Dry Surface Results, Including Quick Drying



Damp-Tex Enamel is Specified in Thousands of Plants for Wet Surface Maintenance

1. Damp-Tex Enamel sticks to any wet surface. Helps force out moisture. Then dries into a tough waterproof film that stops deterioration.
2. Contains no flavor tainting odor.
3. Resists oxidation, corrosive gases. Will not crack, blister, check or peel.
4. One coat covers. One gallon covers 450 square feet of wood or metal surface, 360 square feet of cement, brick, or porous surface, wet or dry.
5. Dries in a few hours. Comes in white and colors.
6. Can be washed repeatedly.
7. Eliminates bacterial and fungus growth.*

*Pre-treated DAMP-TEX 10c per gallon extra

MONEY-BACK GUARANTEE OFFER

On your initial order we will ship one gallon of Damp-Tex at $4.95 or five gallons or more at $4.85 per gallon. Freight allowed on orders of 5 gallons or more. Points west of Rockies add 25c per gallon.

We guarantee that when applied according to directions, Damp-Tex will do everything we claim for it, or upon notification we will give you shipping instructions for unused balance, and cancel charge for amount used, or if paid for, money will be refunded.

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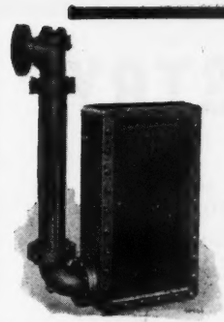
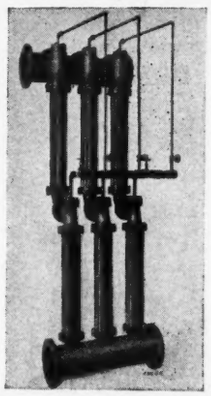


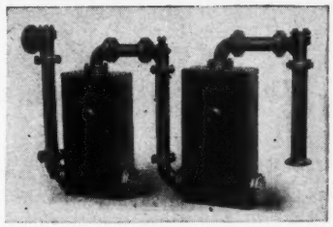
1-stage ejector mounted on direct-contact aftercondenser

STEAM-JET EJECTORS

A steam-jet ejector is one of the simplest methods for removing air, gases and vapors from condensers and vacuum chambers. There are no moving parts.

Ingersoll-Rand furnishes ejectors to handle most any gas or vapor and to produce most any vacuum. Ask the I-R engineer for details.





(Above) *Three-stage ejector with barometric booster and intercondensers*

(Left) *2-stage, 3 element non-condensing ejector with suction and discharge headers*

Ingersoll-Rand

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Keep Goods Moving

PREVENT production tie-ups with Cyclone Metal Conveyor Belts. They move steadily and surely. They are flexible, porous, heat-resistant and sanitary. Unharmed by steam or water. Available in Flat Wire and Chain Link types —in a variety of openings and widths. Write us for further information and prices.

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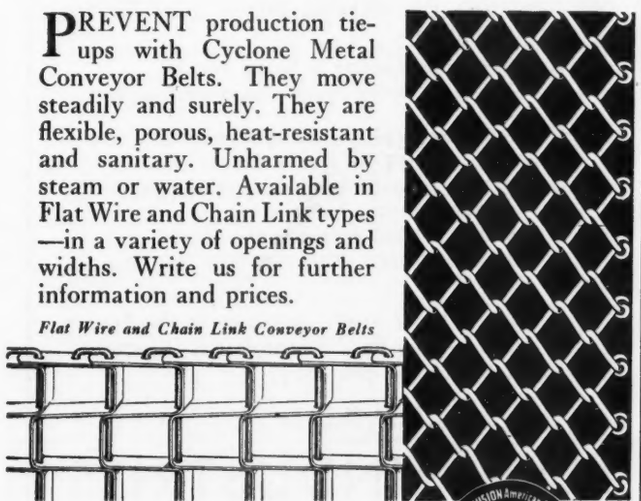

CYCLONE FENCE DIVISION
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Waukegan, Illinois
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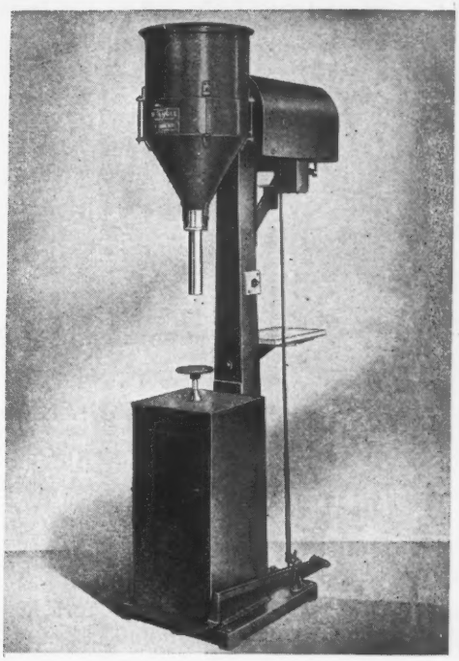
CYCLONE *Metal Conveyor Belts* UNITED STATES STEEL

IF YOU ARE *Packaging* POWDERS



TRIANGLE CAN HELP YOU!

Producers of egg powders, milk powders or any similar products requiring tight, accurate packing will find Triangle Auger Packers second to none for speed, flexibility and economy. A complete range of automatic and semi-automatic equipment is available to meet any production requirements.

Triangle experience, based on hundreds of installations of equipment especially designed to package even the hardest to handle powders, will help you get the right answer for your job in a hurry.

Also a complete line of Fillers, Weighers and Carton Sealers for all dry products. Write for facts and literature today.

ILLUSTRATION—Model U Auger Packer. Production 15 to 30 packages per minute. Range 1 oz. to 5 lbs. One operator required. Extreme accuracy.

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Our Organization is prepared to—

Design, Construct and Equip Complete New Plants or Specify and Install Dehydration Units in Existing Plants for the DEHYDRATION OF FRUITS, VEGETABLES, MEATS AND OTHER FOODS.

These activities are under the personal supervision of one of the country's foremost Food Technologists (long a leader in the development of Dehydration).

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Refrigeration should be considered as an adjunct to the Dehydration Industry, and we are prepared to make complete investigations and recommendations regarding DEHYDRATING with reference to:

- Sources of RAW MATERIALS and REFRIGERATED STORAGE
- Selection of the BEST PROCESS
- Development of the most efficient EQUIPMENT and PLANT LAYOUT
- Proper STORAGE and PROTECTIVE PACKAGING

—ALL IN RELATION TO THE REQUIRED INVESTMENT AND EARNING CAPACITY.

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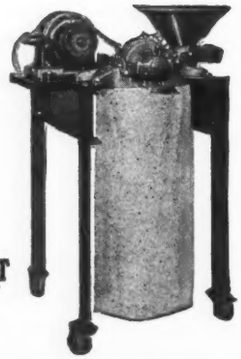

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Frozen Foods Directory

This Directory is the most comprehensive "quick" picture of activities in the Frozen Foods Industry yet published. In addition to listing the names of the companies, the following data is given for the majority of them:—

1. *WHERE* the freezing is being done!
2. *HOW* it is being done—what system is used!
3. *WHAT* products are being frozen!
4. *BRAND NAMES* of frozen foods!
5. *THE TYPE* and size of containers and packaging materials being used!
6. *The QUANTITIES* frozen in the past!
7. *THE SCHEDULED PRODUCTION* for the future!

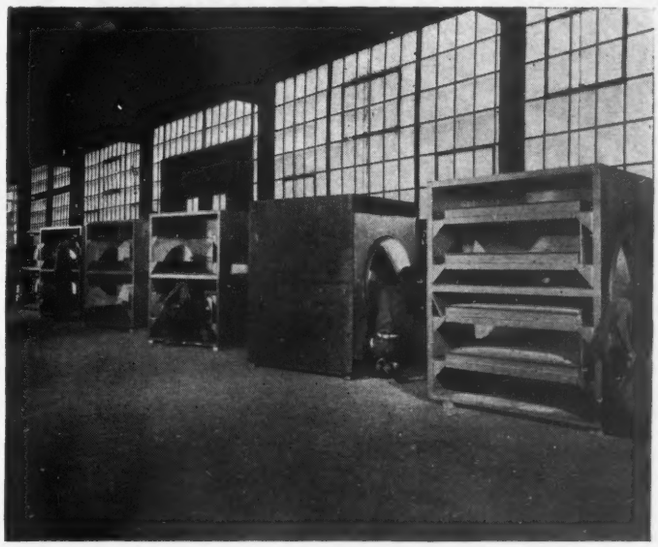
If you want to know what's going on in the Frozen Foods Industry—see this "Frozen Foods Directory." Now available at 35¢ per copy.

Note—10 or more copies to one address—25¢ each

FOOD INDUSTRIES
Department FD
330 West 42nd Street, New York, N. Y.

Food Processors

TAKE A TIP FROM THE DRUG INDUSTRY



Service performed by hundreds of Lectrodryers like these in the Drug Industry guide our engineers' recommendations to you.

There are unknowns a'plenty to plague you when you get into food dehydration. Fortunately, the Drug Industry has already solved some of the problems you will encounter.

For years, the pharmaceutical industries have obtained winter dryness in their tray driers on humid summer days by drying the air with Lectrodryers. Thus they have reduced their processing time and held products uniform, regardless of outside weather conditions. Others, needing a greater degree of dryness than is possible with standard methods, have used Lectrodryers to reach moisture contents lower than heretofore possible.

In the food industry, drying operations on which Lectrodryers can certainly help may be grouped as follows: 1. Standardizing drying conditions in your present driers. 2. Giving you a degree of dryness better than the most favorable weather conditions. 3. Conditioning air for processing and packaging operations.

There are hundreds of Lectrodryer installations on comparable work throughout industry. Recommendations on drying given you by our engineers are based on years of experience, not guesswork. If dehumidification is one of your problems, let us help you. Write to PITTSBURGH LECTRODRYER CORPORATION, 301 32nd Street, Pittsburgh, Pa.

LECTRODRYERS DRY WITH ACTIVATED ALUMINAS

PITTSBURGH

LECTRODRYER

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CORPORATION

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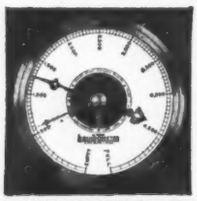
LIQUIDOMETER Tank Gauges

"THEY'RE ALWAYS DEPENDABLE"

Now, more than ever, industrialists realize the importance of having accurate measurements of their stored liquids available at all times. LIQUIDOMETER Tank Gauges insure true, convenient, hazard-free, 100% automatic readings. No pumps, valves, or auxiliary units required to read them. Models are available so that readings can be taken remotely from or directly at the tank. Remote reading types utilize balanced hydraulic transmission system which completely compensates for temperature variations on communicating tubing. Accuracy unaffected by specific gravity of tank liquid.



Approved for gauging hazardous liquids by Underwriters' Laboratories and similar groups.

Models available to automatically control pumps, motors, signals or other devices for maintaining minimum or maximum liquid levels.

Write for complete details

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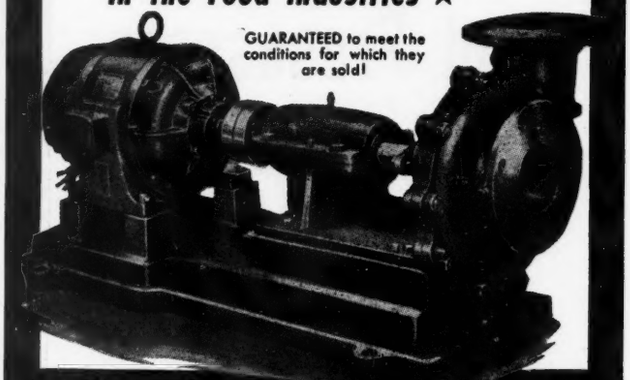
★ DESIGNED for efficient service in the Food Industries ★

GUARANTEED to meet the conditions for which they are sold!



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Uniform SPEED For EVERY PROCESS
LA PORTE
FLEXIBLE STEEL CONVEYOR BELTING
LOOK FOR IMPRINT "LA PORTE" IN METAL TO BE SURE IT'S A LA PORTE

It's Stretchless • Slipless • Longwearing

Constant pulley speeds are maintained in LA PORTE Conveyor Belting, because it does not stretch, slip, weave, creep nor jump. This assures a more uniform handling of products in process from the grading table to the shipping room. The open mesh feature permits the circulation of air, heat, and water around products in process, and facilitates sterilizing with steam gun or scalding water without removing belt from pulley stands. In addition, its perfectly flat surface provides for conveying all types of containers empty or filled.

LA PORTE Flexible Steel Conveyor Belting will stand up under heavy loads, resists loading impacts and gives longer, more efficient service at lower cost.

Ask your Mill Supply House for LA PORTE Conveyor Belting in galvanized steel—available in any length and practically any width.

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of the FOOD INDUSTRIES

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- Edible Gelatin
- Edible Oil Processing
- Flour Milling
- Ice Cream
- Macaroni
- Malt Syrups
- Meat Packing
- Milk Plants
- Preparation of Salted Peanuts and Refining of Used Cooking Oil
- Prepared Mustard
- Refined Cane Sugar
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These Flow Sheets, developed by Food Industries, are specifically designed for production men to give them basic information on standard processes in use throughout the food field. Size 8½ x 11 inches, attractively bound in a paper folder. Price 50c for the complete set listed above.

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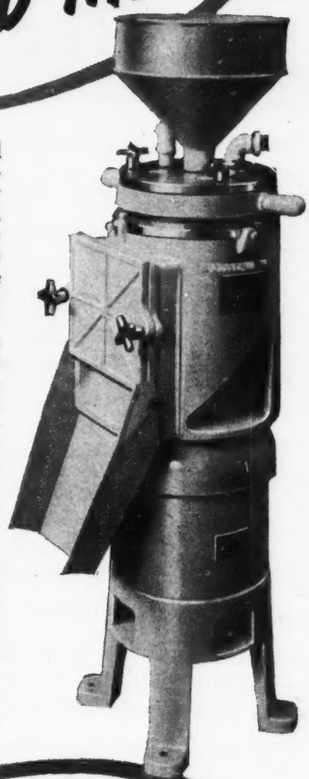
NO SETTLING OR SEPARATING when you use THE PREMIER COLLOID MILL



When you make your food product, you make it carefully. You take pains not only to *make* it quality goods—but to make it *look like* quality goods. Why not, then, reduce settling or separation on the dealer's shelves to a minimum? Now, when so many products are being packed in glass, you need more than ever the appearance insurance Premier Colloid Mills give.

Premier Colloid Mills reduce particles to such fineness, deliver such complete dispersion, that problems of settling or separation are overcome. And remember that Premier Colloid Mills are so simple mechanically that they reduce maintenance costs to a minimum. Premier Mills have only one moving part—the Rotor. *This rotor, and its accompanying stator, are the simplest in the world.* For better food processing, consult Premier.

SOME OF THE FOOD PRODUCTS WHICH CAN BE IMPROVED WITH THE **PREMIER COLLOID MILL**

MUSTARD • OLIVE GRINDING • MEAT SAUCE • SALAD DRESSING • MAYONNAISE • CHOCOLATE COMPOUNDS SOYA BEANS • SOUP COMPOUNDS • FOOD PASTES ICE CREAM SAUCES • FRUIT JUICES • COCOANUT GRINDING • PEANUT BUTTER • VEGETABLE GRINDING FISH GRINDING • DESSERT PREPARATIONS

FREE... *copy of a new booklet F-1 "Better Products—More Profitably Processed", will be sent upon request.*

PREMIER

PREMIER MILL CORPORATION
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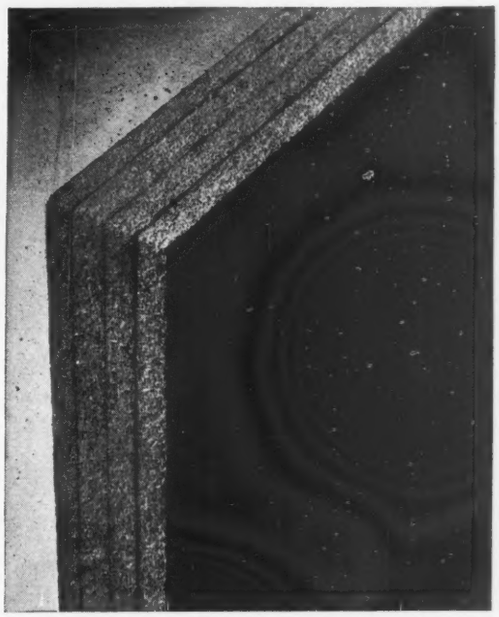
New York Sales Office: 110 E. 42 Street, New York, N. Y.

CELO-BLOCK OFFERS YOU

Efficiency • Economy • Availability

and

0.30 CONDUCTIVITY!



and Its Extra Asphalt Membranes are Mighty Important Guards Against Moisture Penetration!

DON'T let lack of insulation hold up your cold storage construction plans! Celotex Celo-Block Cold Storage Insulation is available *right now!* It is made from selected cane fibres felted into half-inch low-density boards, which are then laminated together with special asphalts between layers and asphalt coated on outer surfaces.

Thus two-inch thick Celo-Block has *five* moisture-resistant asphalt membranes—one for every half-inch thickness—which means that the danger of moisture penetration is permanently avoided—to keep the insulation always at its highest efficiency!

Standard thicknesses are 1½", 2" and 3". Standard sizes are 18"x18" and 18"x36". All fibres, before being felted into boards, are sterilized, waterproofed, and permanently protected from termites and dry rot by the exclusive, patented Ferox Process. Send coupon for free sample and specification sheet.

CELO-BLOCK

TRADE-MARK

COLD STORAGE INSULATION

THE CELOTEX CORPORATION • CHICAGO

THE CELOTEX CORPORATION, 919 N. Michigan Ave., Chicago, Ill.
Without cost or obligation please send sample and specification sheet on Celo-Block Cold Storage Insulation. FI 8-42

Name.....

Address.....

City..... *State*.....

The Aviation Industry needs Seed Money

THIS Victory crop is sweet—10,000 planes per month next year seem certain . . . 5,000 per month already passed . . . Worldwide average of four enemy planes knocked down for every American plane lost . . . Jap average five to one . . . Still better planes coming off the line.

And beyond the war, some people see a vast new industrial field opening up for America:

▶ Giant freight and passenger airliners, flying the airocean to every part of the globe, linking our cities in a traffic network that will obliterate time.

Family planes that will jump golfers to far off greens.

What are the chances for this exciting post-war crop of commerce and convenient travel from our aviation industry?

We think the chances are rather slim, and we ask you to take a serious look at the reason.

In our proper anxiety to prevent inflation and control war profits, we have passed tax laws that are taking away most of the "seed money" that aviation companies will need when the time comes to go it on their own in the post-war world.

▶ "Seed money" is that part of profit which is held for re-investment in a business to insure its growth.

"Seed money" will pay for research on new and better products. It will pay for retooling when post-war models are produced. It will pay for the study of methods to get the lower costs that widen markets. It will pay for setting up new distributors and dealers, and for hundreds of other activities that are involved in the *growth* of a business.

▶ American industry has grown on "seed money." It has been a national characteristic to re-invest most of our profits in development.

A dangerous confusion between personal profit (salaries and dividends) and re-invested profit (which we have called "seed money") has found its way into our taxing system.

The tax law, and government contracts, should allow American Industry to accumulate funds for the numerous tasks of post-war development.

A sum greater than the total now remaining after taxes will be needed, if we are to take advantage of the new opportunities that will exist after the war.

It is probably the oldest law in economics that enough of each crop must be saved to provide seed for future crops.

Ask your Congressman to see that this economic law is not disregarded in an effort to take excess profits out of war.

Reprints of this advertisement are available in handy booklet form.

McGRAW-HILL PUBLISHING COMPANY, Inc.

330 WEST 42ND STREET • • NEW YORK

Did you ever try to defend a PROFIT?

EVERY business man knows the difference between profit that is paid out to individuals and profit that is held for re-investment and future growth.

The trouble is that the public thinks of profit in terms of yachts, elaborate homes and costly debutante parties. They have learned to think that way because those things get the headlines.

The public does not know that far more profit money has gone back into American business than has ever been taken out for personal spending.

The McGraw-Hill Publishing Company is going to do its share in the job of explaining the difference between these two kinds of profit.

To be sure that the public does not confuse two different things that have always been called by the same name, we have developed the term "Seed Money."

'Seed Money" is explained in the McGraw-Hill newspaper advertisement reprinted on the opposite page. We urge you to read this advertisement carefully and apply its message.

There will be other McGraw-Hill advertisements on this vital industrial need. We hope, too, that other advertisers will adopt the term "Seed Money" and help by selling their employees in their own communities on the danger to living standards in taking away industry's ability to improve its plants and techniques.

* * *

THE McGRAW-HILL NETWORK OF INDUSTRIAL COMMUNICATION

23 publications, which gather "war-news" from the "war-production-front" through a staff of 153 editors and 725 engineer-correspondents... More than 1,500,000 executives, designers, production men and distributors use the editorial and advertising pages of these magazines to exchange ideas on war-production problems.

THE McGRAW-HILL BOOKS

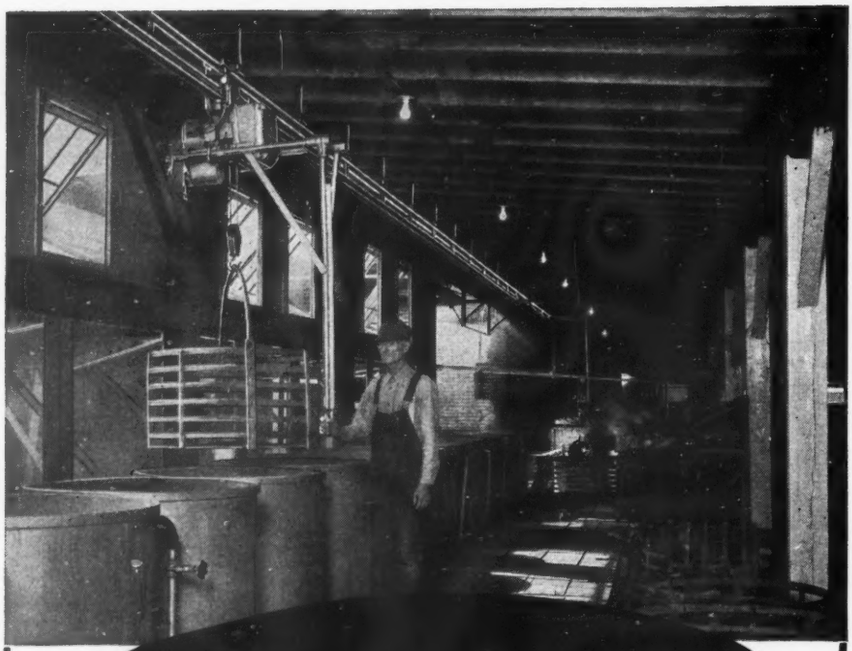
Publishers of technical, engineering and business books for colleges, schools, and for business and industrial use.

McGRAW-HILL PUBLISHING COMPANY, Inc.
330 WEST 42nd STREET • NEW YORK

Aviation—*(AMERICA'S OLDEST AERONAUTICAL MAGAZINE)—INFORMATION HEADQUARTERS FOR THE MEN WHO DESIGN, PRODUCE, OPERATE AND MAINTAIN AMERICA'S AIR SUPREMACY.*

American Machinist
Bus Transportation
Business Week
Coal Age
Chemical & Metallurgical Engineering
Construction Methods
Electrical Contracting
Electrical Merchandising
Electrical West
Electrical World
Electronics
Engineering & Mining Journal
E. & M. J. Metal and Mineral Markets
Engineering News-Record
Food Industries
Factory Management and Maintenance
Mill Supplies
Power
Product Engineering
Textile World
Transit Journal
Wholesaler's Salesman

AFFILIATED WITH BUSINESS PUBLISHERS INTERNATIONAL CORPORATION, PUBLISHERS OF BUSINESS AND TECHNICAL MAGAZINES FOR LATIN AMERICA, AND OVERSEAS CIRCULATION.



DEHYDRATION...
QUICK FREEZE...
OR OLD FASHIONED CANNING

MANY steps in these processes can be speeded... materials moved on accurate schedules when American MonoRail Equipment does the job. You can eliminate much, if not all, manual handling and rehandling.

Let an American MonoRail Engineer show you how this equipment eliminates production delays, decreases handling costs and shows a definite saving in money as well as time. American MonoRail Equipment is available for hand, electric or automatic operation. Send today for the American MonoRail Engineer.

WRITE FOR Blue Book illustrating hundreds of MonoRail installations.

THE AMERICAN MONORAIL CO.
13125 Athens Avenue Cleveland, Ohio

★

for Results

use McGRAW-HILL DIRECT MAIL LIST SERVICE

MAILING LISTS THAT WORK...

McGraw-Hill Industrial Mailing Lists are a direct route to today's purchase-controlling executives and technicians in practically every major industry.

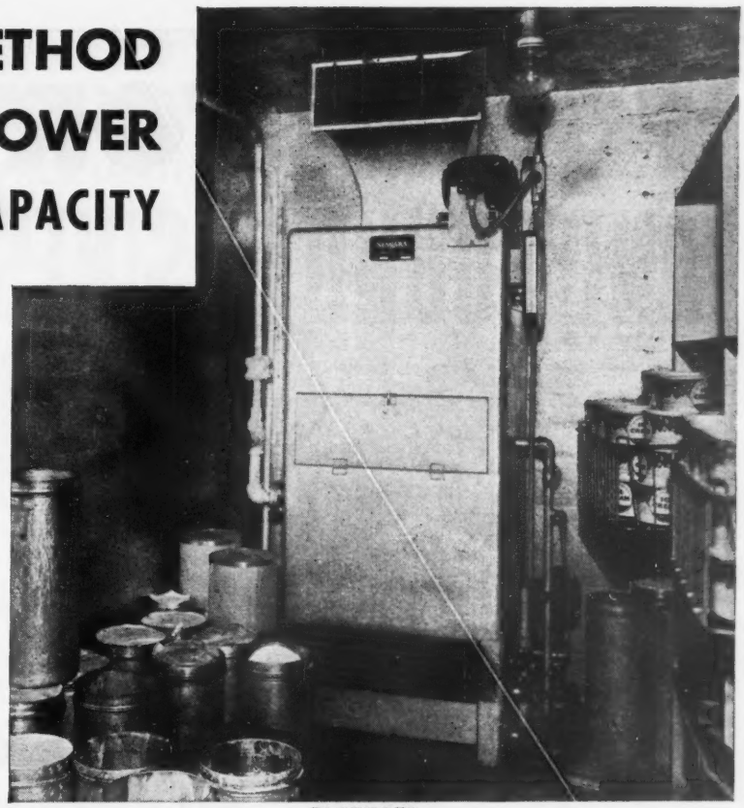
These names are of particular value now when most manufacturers are experiencing constantly increasing difficulty in maintaining their own lists.

Probably no other organization is as well equipped as McGraw-Hill to solve the complicated problem of list maintenance during this period of unparalleled changes in industrial personnel. These lists are compiled from exclusive sources, based on hundreds of thousands of mail questionnaires and the reports of a nation-wide field staff, and are maintained on a twenty-four hour basis.

Investigate their tremendous possibilities in relation to your own product or service. Your specifications are our guide in recommending the particular McGraw-Hill lists that best cover your market. When planning your industrial advertising and sales promotional activities, ask for more facts or, better still, write today. No obligation, of course.

McGraw-Hill Publishing Co., Inc.
DIRECT MAIL DIVISION
330 WEST 42nd STREET
NEW YORK, N. Y.

NIAGARA *No Frost* METHOD SAVES MONEY *and* POWER GIVES ALWAYS FULL CAPACITY



Users of this improved method in low temperature refrigeration applications save money and power, whether for low temperature processing or storage, in many different industries.

1. Because there is never any loss of capacity.
2. Because no shut-down is needed for defrosting.
3. Because the Niagara NO FROST Method is easier to operate and requires less maintenance labor and expense.
4. Because it reaches extreme low temperatures more quickly and controls temperatures more easily.

Write for Bulletin #83. *Address Dept. FI-13*

NIAGARA BLOWER COMPANY

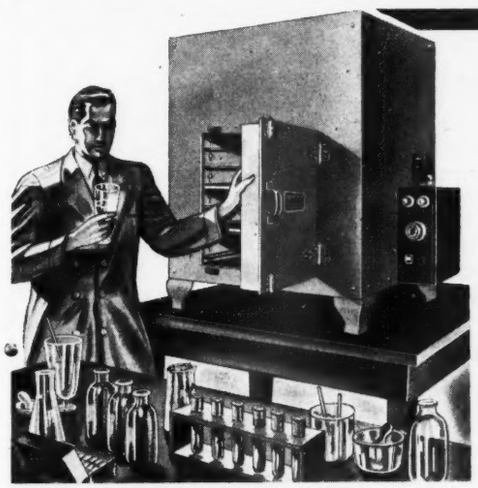
6 E. 45th Street New York City

37 W. Van Buren St., Chicago
648 Hanna Bldg., Cleveland, Ohio
Fourth & Cherry Bldg., Seattle, Wash.
673 Ontario Street, Buffalo, N. Y.

District Engineers in Principal Cities

PATENTED

NIAGARA *INDUSTRIAL* COOLING • HEATING • DRYING HUMIDIFYING • AIR ENGINEERING *EQUIPMENT*



Despatch Oven for test-drying foods, etc. Elec. or gas-fired Sizes (inside) from 13" x 13" x 13" to 37" x 25" x 37"

An easy way to get—

Fast, Accurate, Low Cost

DEHYDRATING DATA

DESPATCH LABORATORY OVEN OFFERS ACCURATE PRE-RUN TESTING

By accurately test-drying *small* food samples in a Despatch oven you obtain important processing data to apply to full-scale dehydration. Simply (1) load small samples; (2) process at any desired heat; (3) test finished products; and (4) apply data to production.

These Features Assure Precision Drying

- HEATS UNIFORMLY so that all samples in chamber are evenly processed.
- FAST AIRFLOW system distributes convection heat perfectly, carries away moisture.
- FULL RANGE ACCURACY at any setting up to 500°F.
- SPEEDY PICK-UP aids production; 2 to 8 min. recovery after loading cold charge.
- EASY LOADING with removable mesh-screen shelves; sturdy supports.
- WIDE UTILITY for your laboratory; handles many processes. Quick response to new, temp. settings.

IMPROVE PRODUCTION METHODS with a DESPATCH OVEN

DESPATCH OVEN COMPANY
MINNEAPOLIS MINNESOTA

MAIL THIS COUPON TODAY!

DESPATCH OVEN CO., Minneapolis, Minn.

Please send Bulletin 105-P listing your Laboratory Ovens.

Name .....

Firm .....

Address .....

Check type of foods to be handled:

☐ NUTS ☐ MEATS ☐ VEGETABLES ☐ FRUITS

Is humidity control desired?

MAIL WITH YOUR LETTERHEAD

FOR VICTORY TODAY
AND SOUND BUSINESS TOMORROW

Get This Flag Flying Now!

This War Savings Flag which flies today over companies, large and small, all across the land means *business.* It means, first, that 10% of the company's gross pay roll is being invested in War Bonds by the workers voluntarily.

It also means that the employees of all these companies are doing their part for Victory . . . by helping to buy the guns, tanks, and planes that America and her allies *must* have to win.

It means that billions of dollars are being diverted from "bidding" for the constantly shrinking stock of goods available, thus putting a brake on inflation. And it means that billions of dollars will be held in readiness for post-war readjustment.

Think what 10% of the national income, saved in War Bonds now, month after month, can buy when the war ends!

For Victory today . . . and prosperity *tomorrow,* keep the War Bond Pay-roll Savings Plan rolling in *your* firm. Get that flag flying now! Your State War Savings Staff Administrator will gladly explain how you may do so.

If your firm has not already installed the Pay-roll Savings Plan, *now is the time to do so.* For full details, plus samples of result-getting literature and promotional helps, write or wire: War Savings Staff, Section F, Treasury Department, 709 Twelfth Street NW., Washington, D. C.

EVERYBODY EVERY PAYDAY AT LEAST 10%

Save With
War Savings Bonds

This Space Is a Contribution to America's All-Out War Program by

FOOD INDUSTRIES

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:

10 cents a word, minimum charge $2.00.

(See ¶ on Box Numbers.)

POSITIONS WANTED (full or part-time salaried employment only), ½ above rates.

PROPOSALS, 50 cents a line an insertion.

INFORMATION

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

The advertising rate is $6.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. F.I.

NEW ADVERTISEMENTS received by 10 A.M. January 18th will appear in the February issue, subject to limitations of space available.

★ HOW TO WIN THE WAR ★
Save Time!
BUY BONDS
BUY EQUIPMENT FROM
"CONSOLIDATED"

1—Pneumatic Scale Packaging Unit.
1—Pneumatic Scale Automatic Wax Liners.
7—300 gal. Copper closed tin-coated Tanks.
1—J. H. Day #2 Brighton Mixer, 80 gal. cap.
6—8 to 40 gal. Pony Mixers.
15—Dry Powder Mixers, from 50 to 4000 lbs.
1—Stokes & Smith auger type auto. Powder Filler.
2—80-qt. Century 4-speed Mixers, m.d.
1—Buffalo 48"x40" Bronze Rotary Vac. Drum Dryer.
1—26"x60" couble drum Dryer, comp.
3—Buffalo 17-shelf Vac. Shelf Dryers, 42x42".
1—Buffalo 24" Vanilla Bean Chopper.
1—World 1-Ermold semi-auto. Labeling Machines.
2—Karl Kiefer Visco Filling Machines.
1—Johnson mod. JA Cellophane Wrapper.
11—Filter Presses P & F; Recessed; to 42" Square.
2—World Rotary Automatic Labeling Machines.
2—Mechanical 4x9' Lard Rolls, m.d.
1—#6 Sweetland Filter, 12 bronze leaves, 3" c.c.
17—Stainless Steel, Copper, Aluminum; Glass Lined; Kettles and Vacuum Pans, up to 550 gal. cap.
15—Schultz-O'Neil Pulverizers.
1—54"x45" Monel Lined Direct Heat Dryer.
3—K.K. & U.S. Rotary bottle Rinsers, m.d.
2—Premier 5" and 10" Colloid Mills, m.d.
1—5x35' Louisville Steam Tube Dryer.
1—Elgin 12-spout Rotary Piston Filler, S.S.
12—Copper Tanks to 5000 gal.
1—Johnson T & B Sealer Unit.
1—36" x 84" Double Drum Dryer.
2—O. & J. 7-place Rotary Labelers, m.d.
1—Stokes 500 gal. Copper Jack. agitated Vacuum Pan.

• *Send for "Consolidated News" listing complete stock.*

We buy and sell from a Single Item to a Complete Plant
CONSOLIDATED PRODUCTS CO., Inc.
Office: 13-17 PARK ROW, N. Y. Shops: 335 DOREMUS AVE., NEWARK
Buy With Confidence — "Consolidated"

BAG MAKING and MACHINE PACKAGE WRAPPING — for Sale

Present size range 1½" x 3½" x 9" to 3¼" x 4⅜" x 21". Package Machinery Co. Model FA3. Photo Electric Eye. Four years old. Good repair. Priced for quick sale.

DOUGHBOY MILLS, INC., New Richmond, Wisc.

WANTED

2—Rotex Screens; 1—Packaging Machine; 1—Glass Lined Kettle; Stainless Steel, Monel, Copper or Aluminum Jacketed Kettle and Vacuum Pan.
2—Tablet Machines; 3—Filters.
2—Dry Powder Mixers, with or without Sifters.

W-644, Food Industries, 330 W. 42nd St., N. Y. C.

WANTED

Used vegetable dicer Model B Urschel Preferred.

NEON PRODUCTS, INC.
LIMA, OHIO

WANTED

Triangle S K Weigher or Automatic Scale that will weigh 2 and 5-pound bags of free flowing material. Also interested in B-194 Wilcox and Gibbs and Union Special Series 60000 sewing machine heads.

W-645, Food Industries
330 W. 42nd St., New York City

WANTED

Crown Capper, Model D or E, or any late model capper suitable for Crown caps.

W-638, Food Industries
330 West 42nd St., New York, N. Y.

POSITIONS VACANT

PRODUCTION MANAGER for Dehydration plant in Los Angeles. State detailed information as to experience, salary, etc. P-643, Food Industries, 68 Post St., San Francisco, Cal.

CHEMIST—For research and control work in foods. State age, training, experience and salary wanted. P-647, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

PRODUCTION MANAGER. Food manufacturing plant, New York City. State references and salary requested. P-650, Food Industries, 330 W. 42nd St., New York, N. Y.

POSITIONS WANTED

CHEMIST — Executive trained in chemistry, bacteriology and chemical engineering with many years experience in directing food research, piolt plant development in canning, freezing, deaeration and dehydration of foods, is seeking a change. Will consider permanent position offering substantial salary. PW-642, Food Industries, 68 Post St., San Francisco, Cal.

FOOD CHEMIST, M.S., 25 years in supervision of production and control of food and dairy products, desires permanent position. Knowledge of bacteriology, engineering and vitamin fortification. Western or west-coast location preferred. PW-646, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

Do YOU need an idea man? Food technologist, Che. Eng. M.S. (Organic Chemistry), desires research or development work in food field. 25 years practical experience. Has worked on many food processes and products. Eager to tackle your problems. PW-648, Food Industries. 520 N. Michigan Ave., Chicago, Ill.

WANTED

WANTED: Urschel continuous vegetable peelers and dicer strippers. Will buy, rent, or trade. Have Urschel Centrifugal slicer. W-651, Food Industries, 68 Post St., San Francisco, Cal.

WANTED—Three Aluminum Jacketed Kettles, One—200 gallons; two-60 gallons. Two 40 x 48 Retorts. W-649, Food Industries, 330 W. 42nd St., New York, N. Y.

PRIME LOANS TO CORPORATIONS and INDIVIDUALS
Unsecured or Collateralized
LARGE Sums—LOW annual rates.
COLLATERAL DISCOUNT CORP.
Graybar Bldg.—New York City

WHEN *Answering Advertisements*

PLEASE *do not send original letters, certificates or photographs. We cannot be responsible for their return. Please send photostat or carbon copies.*

LABELERS and CAPPERS

- World
- Ermold
- National
- Burt
- Knapp
- O. & J. Automatic
- Weeks - McDonald and others

WANTED! YOUR SURPLUS EQUIPMENT

3—PNEUMATIC Scale 6' Head. Automatic Cappers, Capems, also Haskins, Elgins, Etc.

FIRST MACHINERY CORP.

FMC

9th ST. & EAST RIVER DRIVE, NEW YORK CITY

GUARANTEED! Rebuilt Equipment

BOTTLING EQUIPMENT

LABELERS
2—Ermold 6-wide Automatic
4—World Rotary Automatic
1—O & J Duplex Automatic
2—O & J Simplex Automatic
1—Liquid Semi-Automatic
2—World improved Semi-Automatic
2—Ermold Improved Semi-Automatic
2—World Jr. Semi-Automatic

FILLERS
2—U. S. Bottlers 5-spout Vacuum
2—Hallier 18-spout Automatic
3—Bishop & Babcock 34-spout Automatic
1—Liquid 40-spout Automatic
2—Liquid 32-spout Automatic

CAPPERS
1—Resina Single-Head Automatic
2—Pneumatic Scale of 4-head Automatic
1—Consolidated Packaging Co. Automatic

CROWNERS (for 26 mm. crown closures)
1—CC&S Jumbo Model E 7-Head Automatic
2—CC&S Jumbo Model D 7-Head Automatic
1—Adriance 805 Duplex Automatic
1—Kendall Jr. Single-Head Automatic
2—CC&S Semi-Automatic
2—Adriance 804A Semi-Automatic
1—Modern Bond Semi-Automatic

WASHERS
1—Meyer Dumore Qt. 4-wide, 3-cmpt.
1—Meyer Dumore Qt. 8-wide, 1-cmpt.
1—Meyer Dumore Pt. 8-wide, 3-cmpt.
1—Liquid Superkleen Qt. 8-wide, 3-cmpt.
1—Liquid Superkleen Qt. 8-wide, 3-cmpt. (2 floor)
1—Liquid Superkleen Qt. 8-wide, 2-cmps.

PASTEURIZERS
4—Liquid Basket style, capacities 12, 15, 20 and 30 bbls. per hour
2—Barry-Wehmiller Basket Style, 20 and 40 bbls. per hour
2—Automatic Yundt 20 bbl. per hour
1—Loew Midget Tray Style
1—Loew New Era Truck Style

TANKS
1—100 gal. Nickel lined water jacketed, agitator
3—200-gallon Vertical Pfaudler Jacketed Agitator
3—250-gallon Horizontal Pfaudler Agitator
2—300-gallon Vertical Glascote Jacketed Agitator
2—1300 gal. Nickel Storage
22—3000-12000 gallon Horizontal Pfaudler Storage

FILLERS
1—Ayars #2 Automatic
1—Elgin 6-spout Automatic Plunger Type

FILTERS
2—Ertel 12" Disc Filters
1—Kiefer 12" Disc Filters
1—Shriver 12" C. p. & f.
2—Sweetlands #7 and #10

MISCELLANEOUS
1—4 x 4 Frick Self Contained Ammonia Compressor
1—York 7½ x 7½ Y-28 Ammonia Compressor with 60 HP AC motor, etc.
3—80 qt. Hobart Mixers
200'-1½" 4-ply hose
2—Langsenkamp Copper Kook More Heating Coils

Kettles, Tanks, Agitators, Thermometers, Heating Coils, Ammonia Compressors, etc.

FOR SALE

100 gal. **S.S. Tank,** jkt., agit., 32x34.
300 gal. **S.S. Tank,** jkt., agit., 44x48.
60 gal. **Pfaudler Evap. Kettle,** 48x16.
200 gal. **Pfaudler Tank,** jkt., 38x42.
300 gal. **Pfaudler Tank,** insul., 42x50.
3—300 gal. **Pfaudler Tanks,** jkt., agit.
330 gal. **Pfaudler Tank,** jkt., agit., 54x34.
550 gal. **Pfaudler Tank,** horiz., 48x72.
2,000 gal. **Pfaudler Tank,** horiz., 84x84.
50 gal. **Pfaudler Glass Lined Emulsifier.**
100 lb. Size A **Day Mixer & Sifter.**
2—**Copper Tanks,** 42x42 & 60x60.
American Model B **Juice Extractor.**
40 to 60 gal. **Homogenizers or Viscolizers.**

Large Stock of Milk and Ice Cream Plant Equipment.

Send Us Your Inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York, N. Y.
MUrray Hill 2-4616

WE WILL BUY YOUR SURPLUS EQUIPMENT

CHAS. S. **JACOBOWITZ** COMPANY
1432 NIAGARA ST. Phone LIncoln 3116 BUFFALO, N. Y.
SERVING AMERICAN INDUSTRY FOR OVER 25 YEARS

FOR SALE

13—**Sharples Pressurite Super Centrifuges,** with Motors.
3—**Extractors,** 7" copper baskets.
1—**Devine Rotary Vacuum Dryer,** 3'x15'.
1—**Copper Jacketed Still,** 50-gals., Copper Condenser & Column.
1—**Stokes Evaporator,** 52" x 9', complete with Pumps & Condenser.

R. GELB & SONS, INC.
UNION, N. J. EST. 1866 UNionville 2-4900
(Send for "Gelb News Record")

FOR SALE—USED AND RECONDITIONED

Roller gravity conveyor; Bottle and jar chain belt conveyor M.D.; chain conveyor for cases and cartons M.D.; belt conveyors, horizontal and inclined M.D.; bar-types boosters M.D.; spiral chutes, slide and roller bed; special conveyors; large stock; quick deliveries.

Island Equipment & Supply Co., Inc.
101 Park Ave., New York, N. Y.

FOR SALE

3—**Stainless Steel Jacketed Tanks,** 200 and 215 gals.
3—**Copper Tanks,** 2000 and 2500 gals.
10—**Bronze, Iron Rotary Pumps**
4—**Hobart, Century** 80 qt., 3 speed, **Vertical Mixers,** motor driven
10—**World, Ermold, National** Semi-automatic **Labelers**
2—**World, International** Automatic **Labelers**
4—**Knapp, Burt Can Labelers**
15—**Shriver, Sweetland,** etc. **Filters,** iron, bronze, aluminum, wood construction
16—**Robinson, Day Powder Mixers,** 50 to 2000 lbs., with and without sifters
6—**Ross, Day, Read, W. & P. Trough Mixers,** Lab. to 350 gals.
40—**Copper and Aluminum Jacketed Kettles,** 10 to 450 gals.
5—**Copper** and **Glass Lined Vacuum Pans,** 50 to 500 gal.
2—**Mustard Mills,** high speed, colloid type, with pumps and fillers
6—**Copper Revolving Pans,** 30" and 38"
5—**Stokes, Stokes and Smith Powder Fillers**
3—**Kiefer Visco Fillers**
3—**Kiefer** 24 spout **Vacuum Fillers**
10—**Stokes and Colton** Paste Type **Fillers**

Your Inquiries Solicited

BRILL Equipment Co.
183 VARICK STREET NEW YORK

FILLERS

1—Karl Kiefer Visco Filler
4—M. & S. Four and Six Pocket Aut. Piston Fillers
2—Hansen and Ayers Pea Fillers
2—Filler Machine Co. Four Piston Fillers
1—American Aut. Scale Filler
2—Stokes No. 15 Powder Fillers
3—J. H. Day and Mogul Bbl. and Bag Packers
1—Pneumatic Scale 12 Pocket Rotary Powder Filler
2—Standard Automatic 12 and 15 Spout Vacuum Fillers

FIRST MACHINERY CORP.

FMC

9th ST. & EAST RIVER DRIVE, NEW YORK CITY

FOR SALE

Triangle Model "U" Bag Filler.
Hayssen Cellophane Box Wrapper.
Schutz O'Neill Dustless Sugar Pulverizer No. 3, No. 0 and 16" Limited.
24" Pebble Mill, belt drive.
1 ton York, 1 ton Lipman, 3 ton Frick, 5 ton Jurick and 7½ ton Lipman Self-contained Refrigerating Units.
Steam Jacketed Copper Kettles, 15 gallon to 350 gallon capacity.
Dean Glucose Pump Steam Driven.
Tabor 3" Glucose Pump, motor driven.
Read 80 qt., Hobart 80 qt., Century 30 qt., and Read 12 qt. Vertical Mixers.

SAVAGE BROS. CO.
2638-46 Gladys Avenue Chicago

FOR SALE

Three Sharples #6 Super-Centrifuges, complete with motors, Monel Bowels; price $1,000.00 each.

FS-640, Food Industries
330 West 42nd St., New York City

REFRIGERATOR UNITS

4—1 Ton Freon Condensing Units, with Dry Expansion Evaporators.
New Coils, Rebuilt Condensing Units.

FS-639, Food Industries
330 West 42nd St., New York City

KETTLES—TANKS

JACKETED
SINGLE SHELL

15 Welded Steel Storage Tanks—5000 gal. to 10,000 gal.
1 Glass Lined Jacketed Agitated 42"x64" Vacuum Pan
1 1250 Gal. Glass Lined Truck Type Tank
4 Copper Vacuum Pans 10 to 1250 gals.
7 200 Gal. and 1 300 gal., Glass Lined Agitated Tanks
1 2000 Gal. Glass Lined Jacketed, Agitated Tank
8 1200 Gal. Steel Jacketed Agitated Kettles
35 Steam Jacketed Copper Kettles up to 500 gal.
4 Aluminum & Stainless Kettles 30 to 150 gals.

Specifications on Request.

FIRST MACHINERY CORP. FMC 9th ST. & EAST RIVER DRIVE NEW YORK CITY

WIN THE BATTLE OVER PRODUCTION DELAYS WITH UNION REBUILT GUARANTEED EQUIPMENT

UNION Rebuilt Machinery Established 1912

IN STOCK . . . READY FOR IMMEDIATE DELIVERY!

ALL OFFERINGS SUBJECT PRIOR SALE!

WIRE COLLECT FOR PRICES & DETAILS!

JUST RECEIVED
complete
FILLING, CAPPING AND LABELLING OUTFIT
formerly used by
I-CAR-DE
MAYONNAISE
Boston, Mass.

1 Filler, 6 plunger filling machine, with stainless steel pistons & hopper.
1 Standard, 6 head, screw capping machine.
1 World, rotary, fully automatic labeling machine.

Can be purchased as complete unit with inter-connecting conveyors, as a fully automatic unit, or machines can be purchased individually.

We Pay Cash For Single Machines Or Entire Plants

EVERY MACHINE REBUILT TO UNION'S STANDARD OF PERFECTION

UNION STANDARD EQUIPMENT CO.
318-22 LAFAYETTE STREET
NEW YORK, N. Y.

CHOICE EQUIPMENT

SHARPLES #6 Super Centrifuge, motor driven.
AMERICAN Model B Juice Extractor
U. S. 8 stem Syphon Fillers.
36" SPERRY Filter Press, 2 eye, closed delivery, cast iron, 16 chamber, 2" frames.
SHRIVER 7" & 8" cast iron & nickel plated Filter Presses.
STAINLESS STEEL AUTOCLAVE, 60 gallon capacity, 750 lb. internal pressure.
Bronze Sanitary Pumps, 1¼".
Sifters & Mixers, Sizes 50 to 2000 lb. capacity. *Send for Bulletin "F".*

MACHINERY & EQUIPMENT CORPORATION
59 E. 4th St. N.Y.C.

FOR SALE

1—#9 Robinson Unique Batch Mixer.
3—Lard Rolls, 3x6' and 18x48".
1—Day #1 Hurrell Colloid Mill.
5—Attrition Mills—18, 22 and 30".
1—4-spout Filler Machine Co. Filler.
2—Karl Klefer Visco Fillers.
1—Urie Universal Filler.
6—#300 and #600 DeLaval Clarifiers.
1—#3 Sweetland Filter.
5—Copper Vacuum Pans 3 to 5'.
2—Rotary Bottle Rinsing Machines.
2—M&S Universal Filling Machines.
1—#6 style B Peerless rotary Exhauster.
6—20 gal. jack. Copper Tilting Kettles.
Dough and Powder Mixers, Bottle and Can Fillers, Filters, Filter Presses, Mills, Dryers, Pumps, Boilers.

Send us your inquiries, also your list of surplus equipment, which we purchase for cash.

LOEB EQUIPMENT SUPPLY CO.
908 N. Marshfield Ave. Chicago, Ill.

FOR SALE

Davidson Wet Vacuum Pump new 4½ x 6 x 8
New 60 gal. Monel Steam Jacket Kettle

THOMAS BURKHARD INC.
494 Flushing Ave. Brooklyn, N. Y.

FOR SALE

1—Pneumatic Scale Automatic Screw Capper, for Jars up to 9¾" high.
1—2-spout Automatic Piston Filler for Semi-Solids.
1—Ermold 6-wide Automatic Labeler.
1—Pneumatic Scale Automatic Air Bottle Cleaner.
2—36" Dia. Copper Sugar Coating Pans
1—World Automatic Rotary Labeler
2—Cellophane Wrappers for Small Packages
2—40 Gal. Aluminum Jacketed Kettles
30—Pfaudler Glass-Lined Storage Tanks, 150-12,000 Gals. Capacities.
2—Westco 2" Motor Driven Turbine Pumps
1—40' Long Conveyor Work Table, 10" Belt
1—6-Spout Straight Line Direct Pressure Filler
6—Steel Encased Bucket Elevators and Screw Conveyors for Grain Handling
3—Sets Double Pipe Coolers, 6-15 Pipes High.
2—Copper Vacuum Pans, 39" and 72" Dias.

Many other items for Packaging & Processing.

Write for stock list of available equipment.

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STEEL STORAGE WATER TOWER TANKS

70,000 Gallons-Mounted on 70' Legs
50,000 Gallons-Mounted on 84' Legs

IMMEDIATE SHIPMENT

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FOR SALE

Complete plant used for the manufacture of Edible Coconut Oil Products including Ice Machine, Hydraulic and Filter Presses, Steam and Electric Pumps, Steel Tanks, etc. Closed on account of War.

NATIONAL COCONUT PRODUCTS CO.
P. O. Box 1613 Tacoma, Washington

MIXERS—GRINDERS—PULVERIZERS

FMC Dry Powder Mixers up to 3000 lbs.
Jacketed and Unjacketed Mixers, for Pastes and semi Liquids
2 Sterling #16 Potato Peelers
Hammermills—Williams, Gruendler, Schutz-O'Neill and others
Schutz-O'Neill Pulverizers Limited "D" 28" 14"-16"-22"
Buffalo Kraut Cutters, Choppers, Corers
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Schutz-O'Neill 4 Roll Mill or Granulator

FIRST MACHINERY CORP. FMC 9th ST. & EAST RIVER DRIVE NEW YORK CITY

DIFFUSION BATTERY

Top View—Diffusion Battery

1—8 cell DIFFUSION BATTERY, COPPER and BRONZE; each cell—5' 6" diameter, 8' high, with heating unit and hydraulic lift for dump.

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LOS ANGELES • BUTTE • NEW ORLEANS
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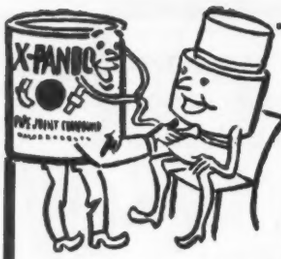

CORRECTS *IMPERFECTIONS IN THREADS And Flange Faces*

Positive expansion after setting does more than end leaks permanently. It smooths flange faces and corrects imperfect or burred threads. In these days when piping is hard to get, this exclusive X-Pando Pipe Compound feature means that you can *repair* pipe joints you would ordinarily be forced to throw out. Get to know X-Pando—ask your local mill supply house. There's an X-Pando distributor near you.

X-PANDO *PIPE JOINT COMPOUND*

Expands as it sets. One formula for all uses. Goes 4 to 6 times further than ordinary compounds. Better than litharge and glycerin for all uses. Expands and contracts with pipe movement. Not affected by vibration, deflection, temperature, or pressures. The perfect sealing compound. Holds anything carried in metal pipe except some heavy acids.

See Your Local Mill Supply House—Distributors Everywhere

X-PANDO CORPORATION

43-15 – 36th Street · Long Island City, N. Y. · STilwell 4-7180

Canadian Distributors: La Salle Products Ltd., 159 Jean Talon St. W., Montreal, Quebec, Canada

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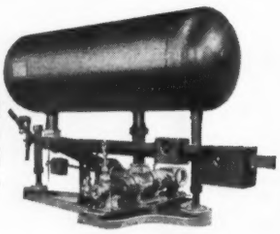
Save fuel—increase production

Investigate today so you can raise your output and lower your fuel costs tomorrow.

Users claim substantial increased production with

13 to 27%

savings in fuel by using ACKER Systems of Steam Drainage, Deaerating and Boiler Feeding. Write for data today.



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3169 Fulton Road, Cleveland, Ohio

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RYERSON CERTIFIED STEELS

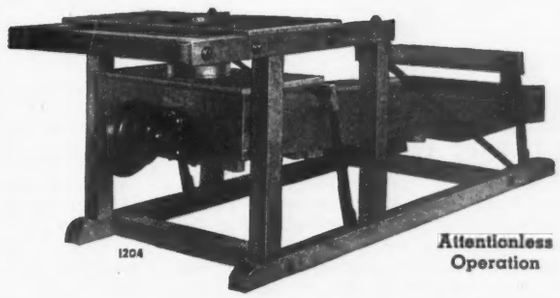
Prompt Shipment from 10 Strategically-Located Steel-Service Plants... Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoops and Bands, Beams and Heavy Structurals, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Flat Wire, Boiler Tubes and Fittings, Mechanical Tubing, Rivets, Bolts, Nuts, Washers, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Detroit, Buffalo, Cincinnati, Cleveland, Boston, Philadelphia, Jersey City.

EUREKA

Sifter

Cleaner **Dresser**

Grader **Bolter**



Attentionless Operation

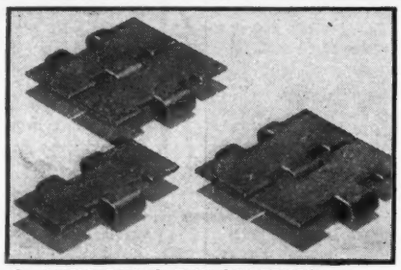
great capacity

for hard-to-screen materials

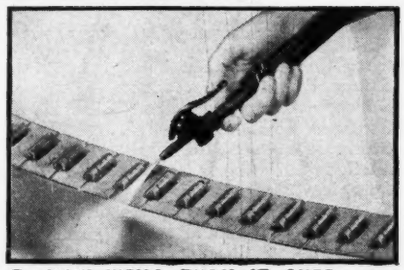
Two-motion excitation—incredibly fast handling of all bulky, 'fluffy or slow-action materials . . . Simple, dependable . . . Small space, trivial power—easily and cheaply installed . . . Made in many sizes—a capacity to suit every need . . . . . Ask for Data-I. 404

S. HOWES CO., INC., Silver Creek, N. Y.

YOU WOULDN'T BELIEVE REX TABLE TOP COULD BE SO SIMPLE! LOOK . . .

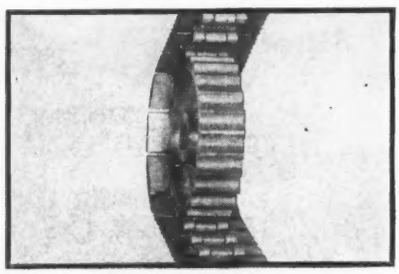


1 HERE ARE YOUR ONLY PARTS—We show you a one-piece link and a pin. These are the only parts in a Rex Table Top conveyor chain belt. Absolutely the *only* ones. As simple as a door hinge. You merely keep adding one to another and get the smoothest, most satisfactory flat top conveyor ever conceived.

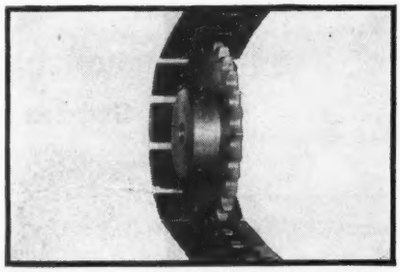


2 LET'S PUT A FEW TOGETHER—Here's a section of Rex Table Top conveyor chain belt assembled from a succession of those links and pins. If you made it a mile longer, the parts and the assembling process would be exactly the same—and you would get a moving platform recognized as tops in the food industry.

3 NOW WE'LL TURN IT OVER—This picture of the drive side of the Rex Table Top further illustrates the almost incredible simplicity of design. There are no pockets where dirt or other foreign matter can collect to start bacteria growth. Cleaning is a mere matter of spraying with a jet of water or steam.



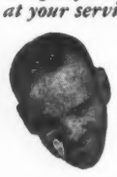
4 IT RUNS THIS WAY—See how the entire length of the Table Top joint is engaged by the teeth of the broad Table Top sprocket. This wider bearing gives you a conveying surface that is literally as smooth and steady as an actual table top. An example of the modern and always practical design which is characteristic of Chain Belt products.



5 CONVENTIONAL FLAT-TOP TYPE—This is the way the ordinary conventional flat top conveyors are made. You'll see that this one requires a separate roller chain and a narrow sprocket which does not give such broad support as the new Rex Table Top. Hundreds of such installations are still in service and are, in fact, still supplied by Chain Belt.

6 WOULD YOU HAVE BELIEVED IT?—Can you imagine such a vastly better and widely preferred conveyor chain belt being so simple? Rex Table Top chain belt with minimum space between links practically ends spillage and breakage due to pile-ups. It requires less maintenance and is easily adapted to conventional tracks.

The engineering ingenuity and direct-to-the-point simplicity that you have just seen demonstrated is typical of the more than 2000 Rex chain belts and conveyors which the Chain Belt Company builds for industry. Remember, the Rex man is always at your service when you build or buy.



REX TABLE TOP CHAIN BELTS

CHAIN BELT COMPANY OF MILWAUKEE

Rex Conveying and Engineering Products Division, Rex Chain Belt and Transmission Division, Milwaukee, Wisconsin • Baldwin-Duckworth Chain Belt Division, Springfield, Massachusetts; Worcester, Massachusetts

REX CHAIN BELT COMPANY

FAITH
in the future

NO obstacles face us that are not small in comparison to those overcome by the brave men and women who pioneered this nation . . . and built it with their faith in the future. You must make your own future. Today, our high speed metal lithographed presses work day and night producing needed metal packages . . . if you produce anything necessary in the interests of defense . . . we can serve you quickly and efficiently. In your plans for the future, we may help you. In the meantime—Look Ahead.

THE HEEKIN CAN CO., CINCINNATI, OHIO

Heekin Cans LITHOGRAPHED WITH HARMONIZED COLORS

THE MOTOR OIL WITH DETERGENCY

plus Dispersion

THE amazing difference in the amount of sludge on these identical filters graphically reflects the difference between high quality regular motor oil used in heavy-duty service, and *TEXACO D-303 Motor Oil.*

The "dirty" filter was used on an engine lubricated with high-quality motor oil of a type still used in some heavy-duty service.

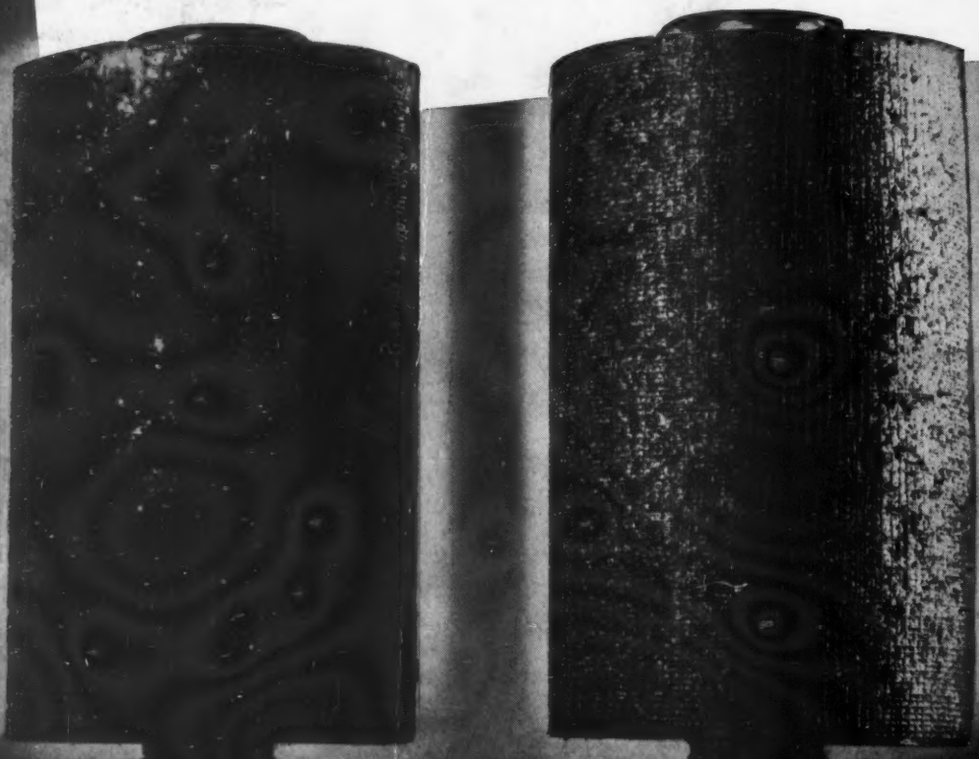
Possessing little or no dispersion quality, such oils permit carbon and other deposit-forming materials to settle out in the engine, building up on filters, screens, oil-pump strainers, and oil-lines.

Now, note the contrast—

When you use *Texaco D-303 Motor Oil,* you get not only detergency, but *dispersion*...meaning that the deposit-forming materials from combustion, etc. do *not* settle out in the engine, but remain in suspension so that they drain away with the oil when it is changed. Result . . . the engine stays clean. *Texaco D-303* also offers high film-strength which protects against scuffing, ring and cylinder wear, etc. It also protects modern alloy type bearings. Its use assures full power, substantial fuel economy, greatly lessened engine repairs and maintenance.

A Texaco Automotive Engineer will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distributing points in the 48 States —or write:

The Texas Company, 135 E. 42 St., N. Y., N.Y.



DISPERSION MAKES THE DIFFERENCE

Dispersion is that quality of an oil which enables it to hold in suspension finely-divided particles of sludge, carbon, etc., so that they drain away at oil-change time.

In the unretouched photograph on the left are shown identical filters in similar engines, service, mileage. The "dirty" filter was used on an engine lubricated with one of the new type additive oils. The "clean" filter was used on an engine lubricated with *Texaco D-303 Motor Oil.*

TEXACO

REG. T. M.

TEXACO Lubricants and Fuels

FOR ALL TRUCKING EQUIPMENT

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT — CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY